



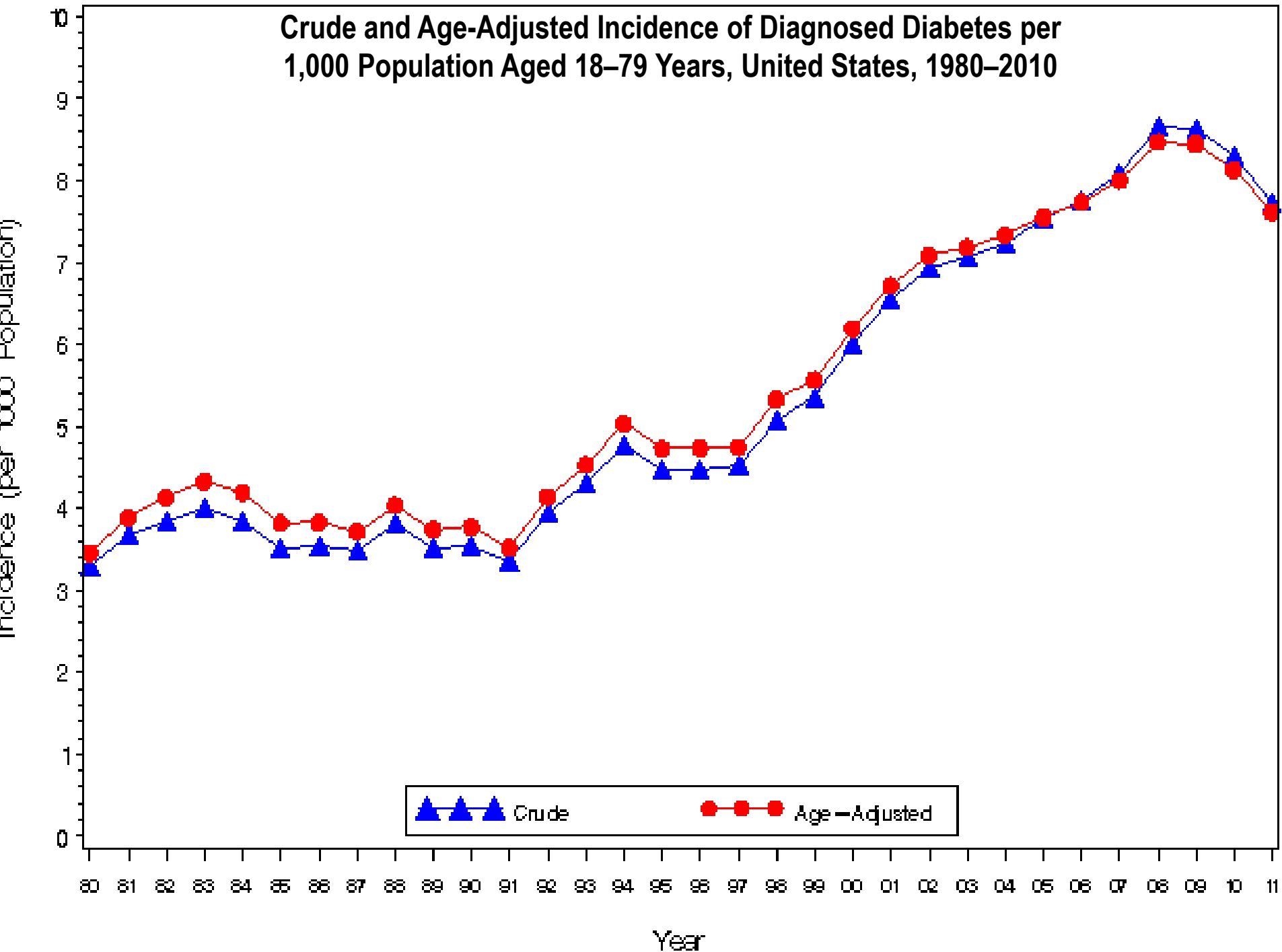
Synergies in Prevention for Diabetes and Cardiovascular Disease: *Why are we here together?*

***Edward Gregg, PhD
Division of Diabetes Translation
Centers for Disease Control and Prevention
Atlanta, GA***

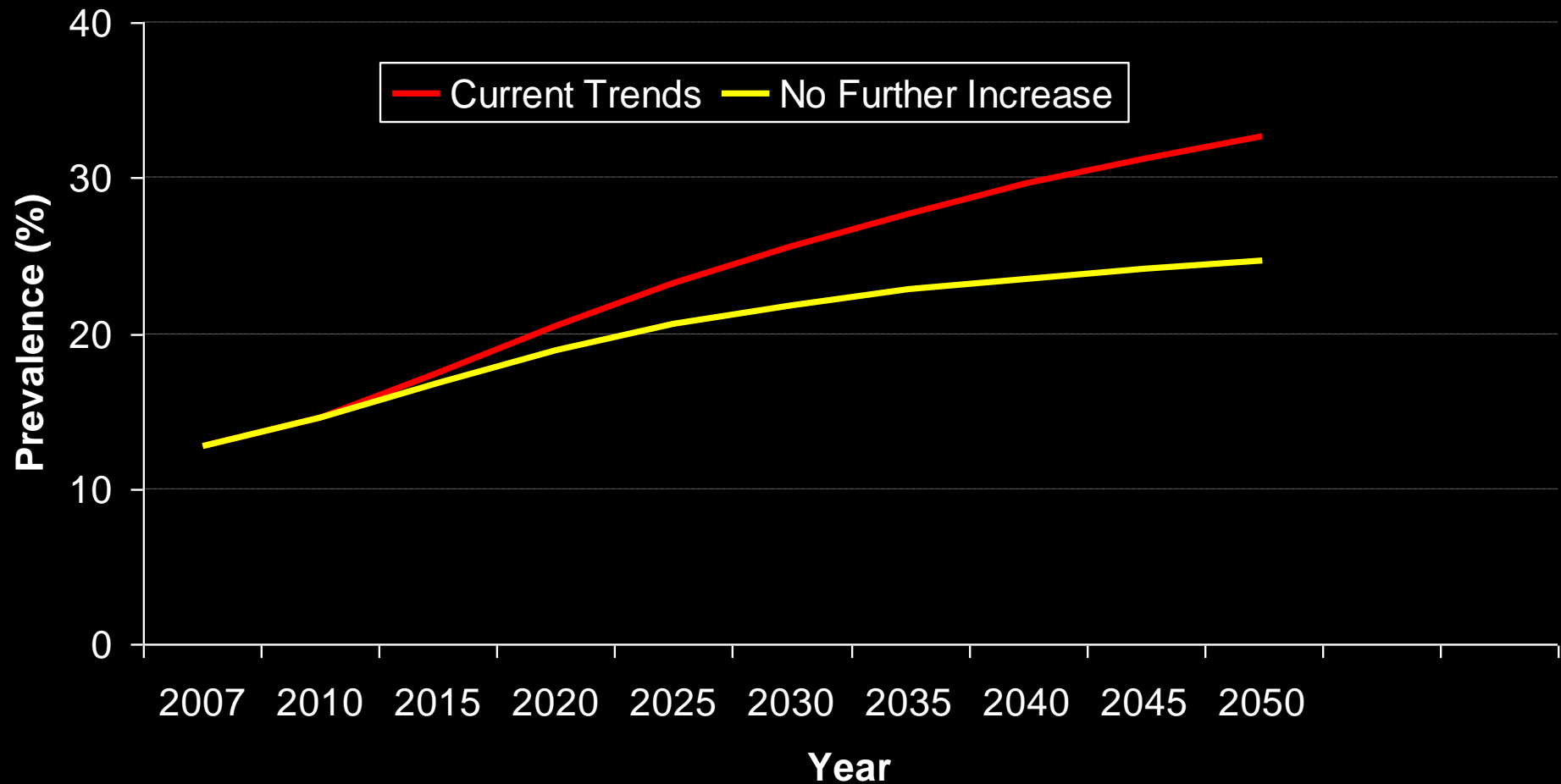
The findings and conclusions of this presentation are those of the presenter and do not necessarily represent views of the Centers for Disease Control and Prevention.

- Why are we here *together*? (i.e., diabetes and CVD?)
- What are the most effective, synergistic public health approaches for diabetes and cardiovascular disease prevention and control?

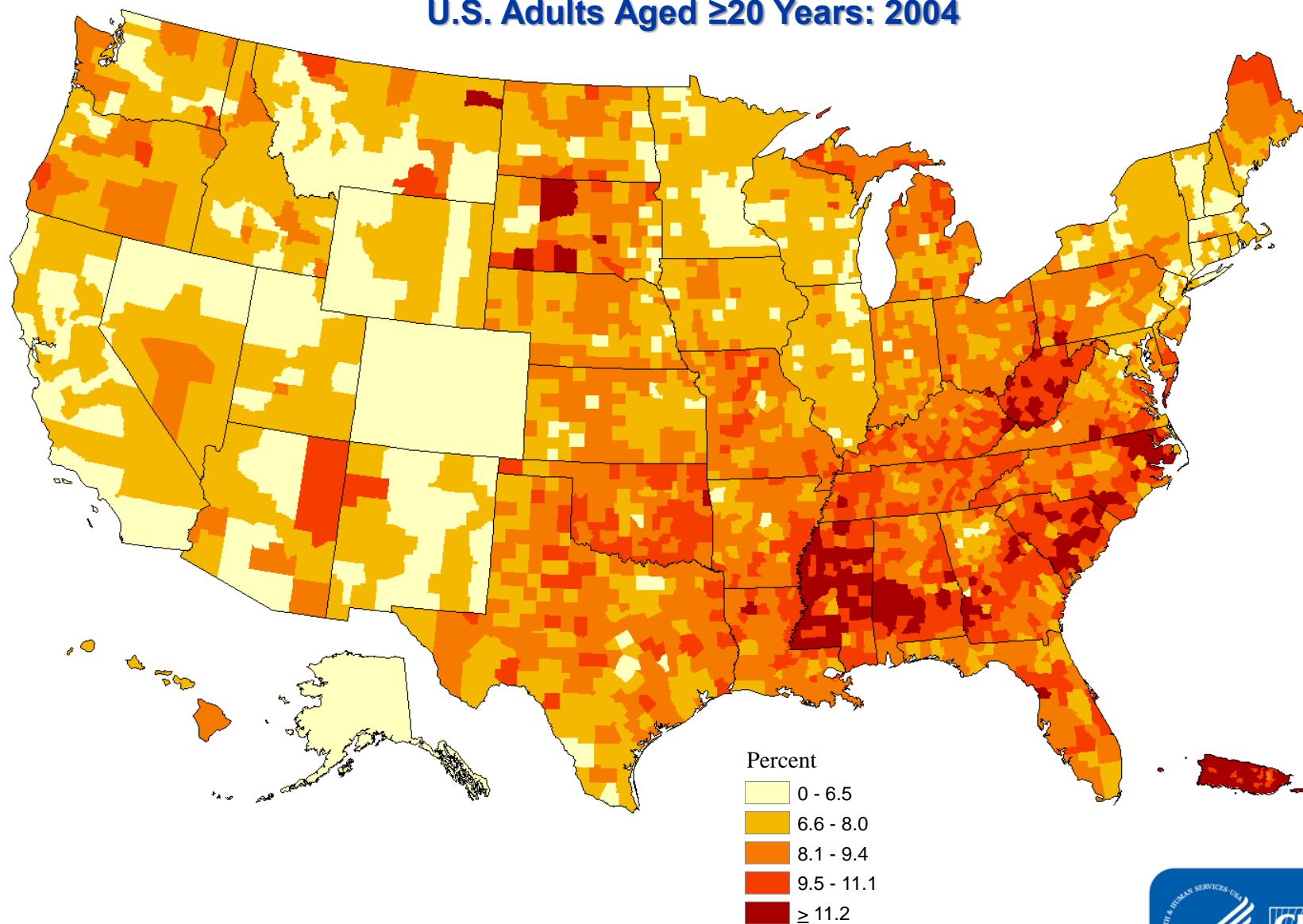
Crude and Age-Adjusted Incidence of Diagnosed Diabetes per 1,000 Population Aged 18–79 Years, United States, 1980–2010



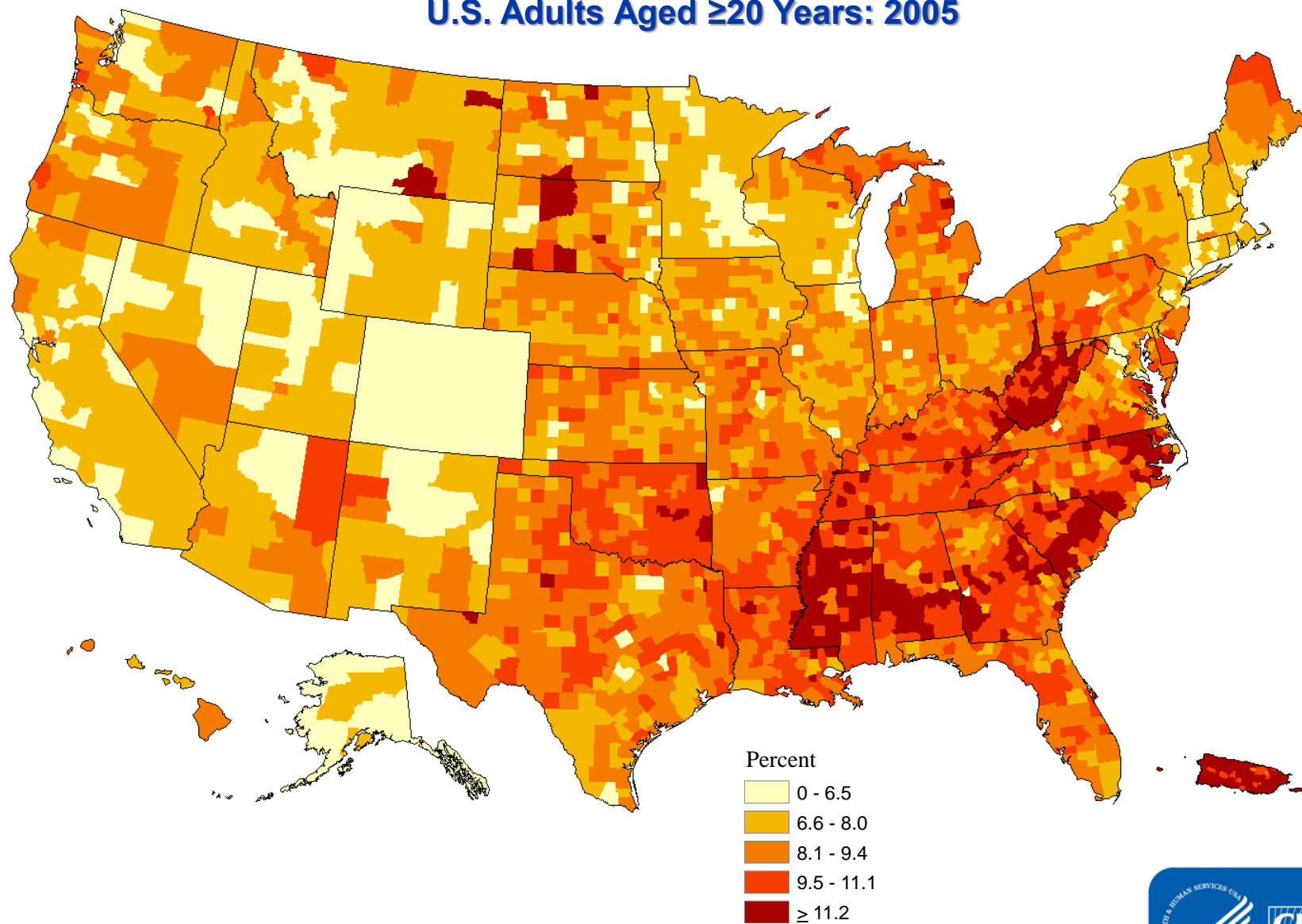
Projected *Prevalence* of Diabetes (Diagnosed or Undiagnosed) Under Scenarios of No further Increase Continued Increased Incidence Rate



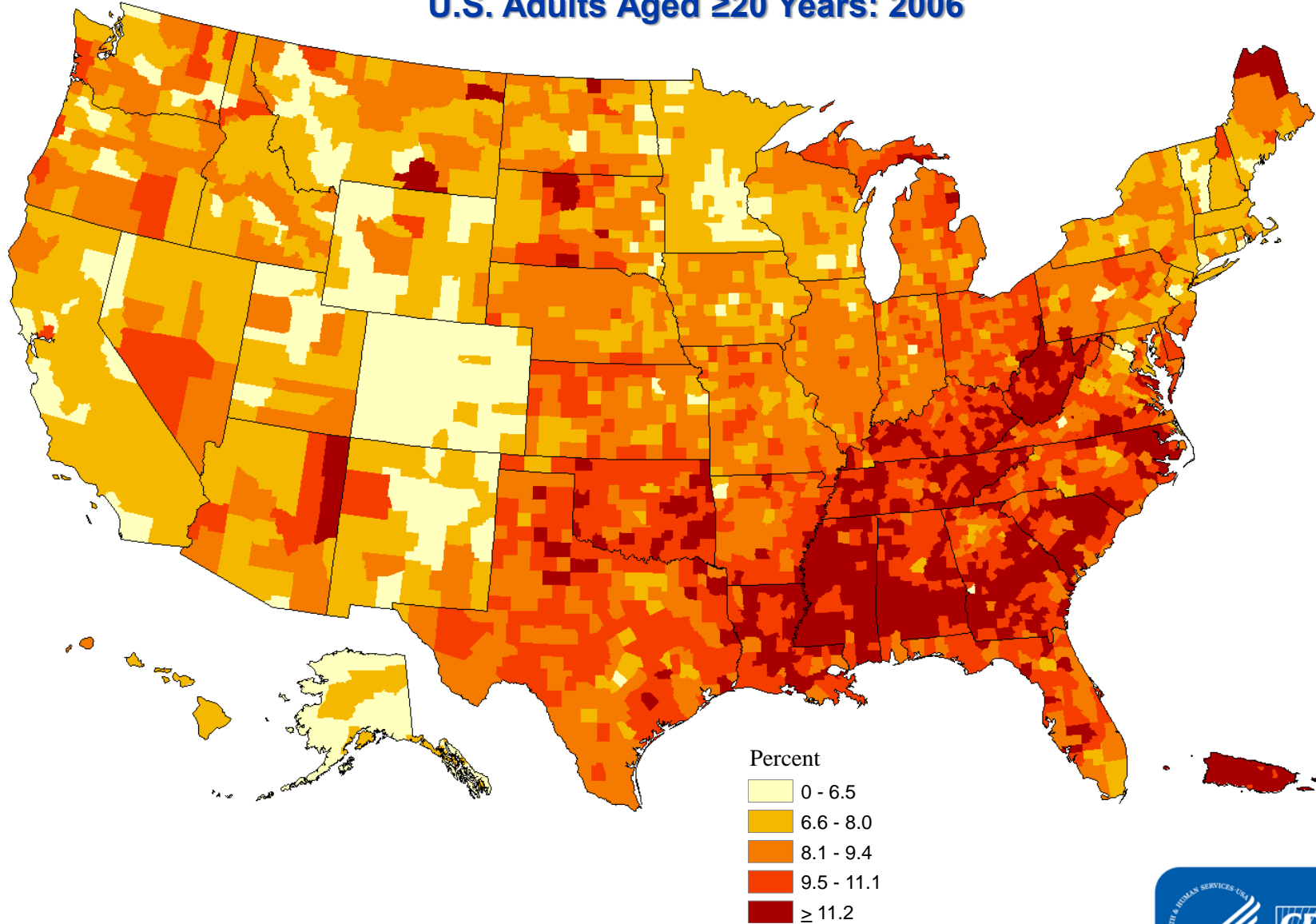
County-Level Estimates of Diagnosed Diabetes Among U.S. Adults Aged ≥ 20 Years: 2004



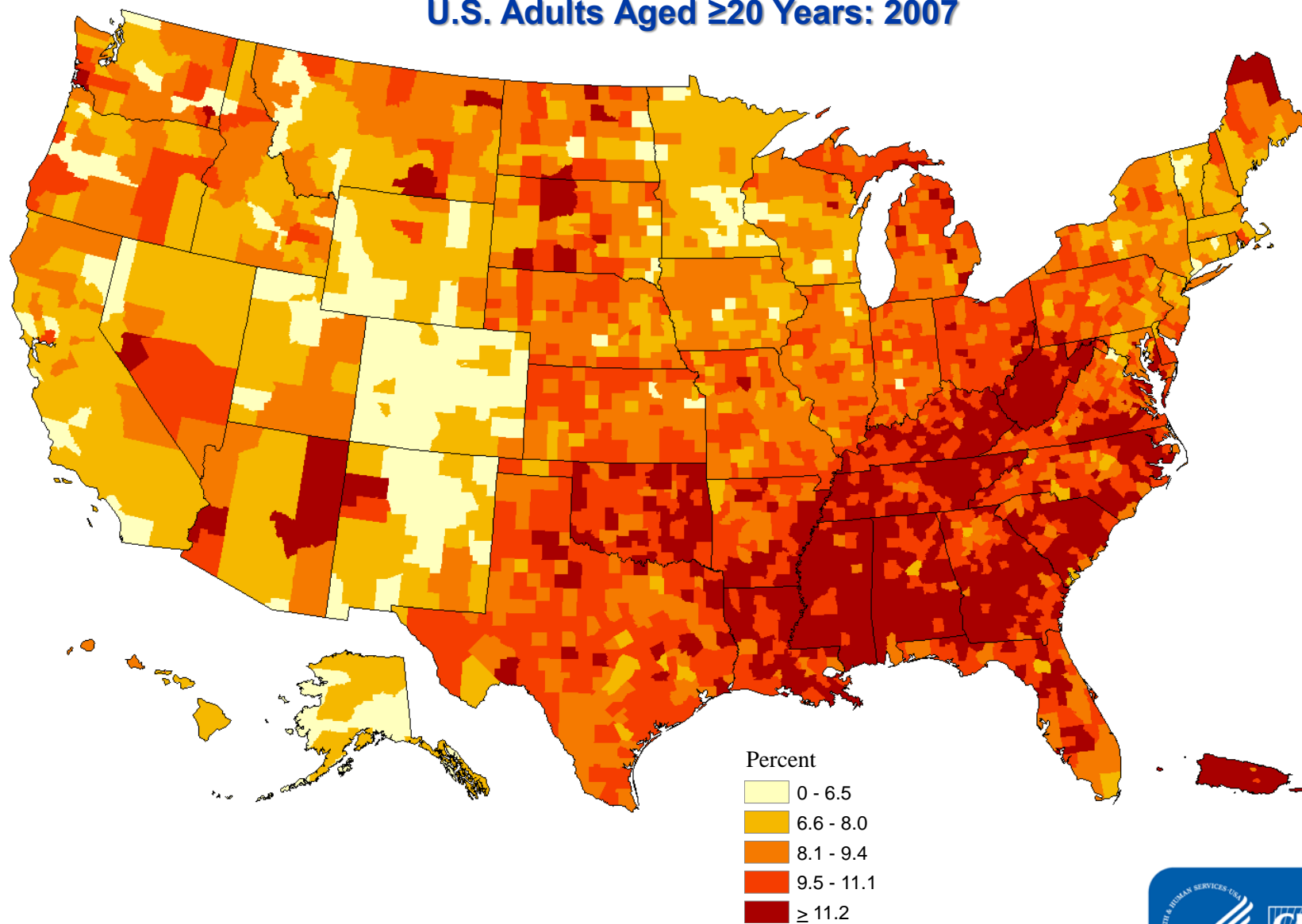
County-Level Estimates of Diagnosed Diabetes Among U.S. Adults Aged ≥ 20 Years: 2005



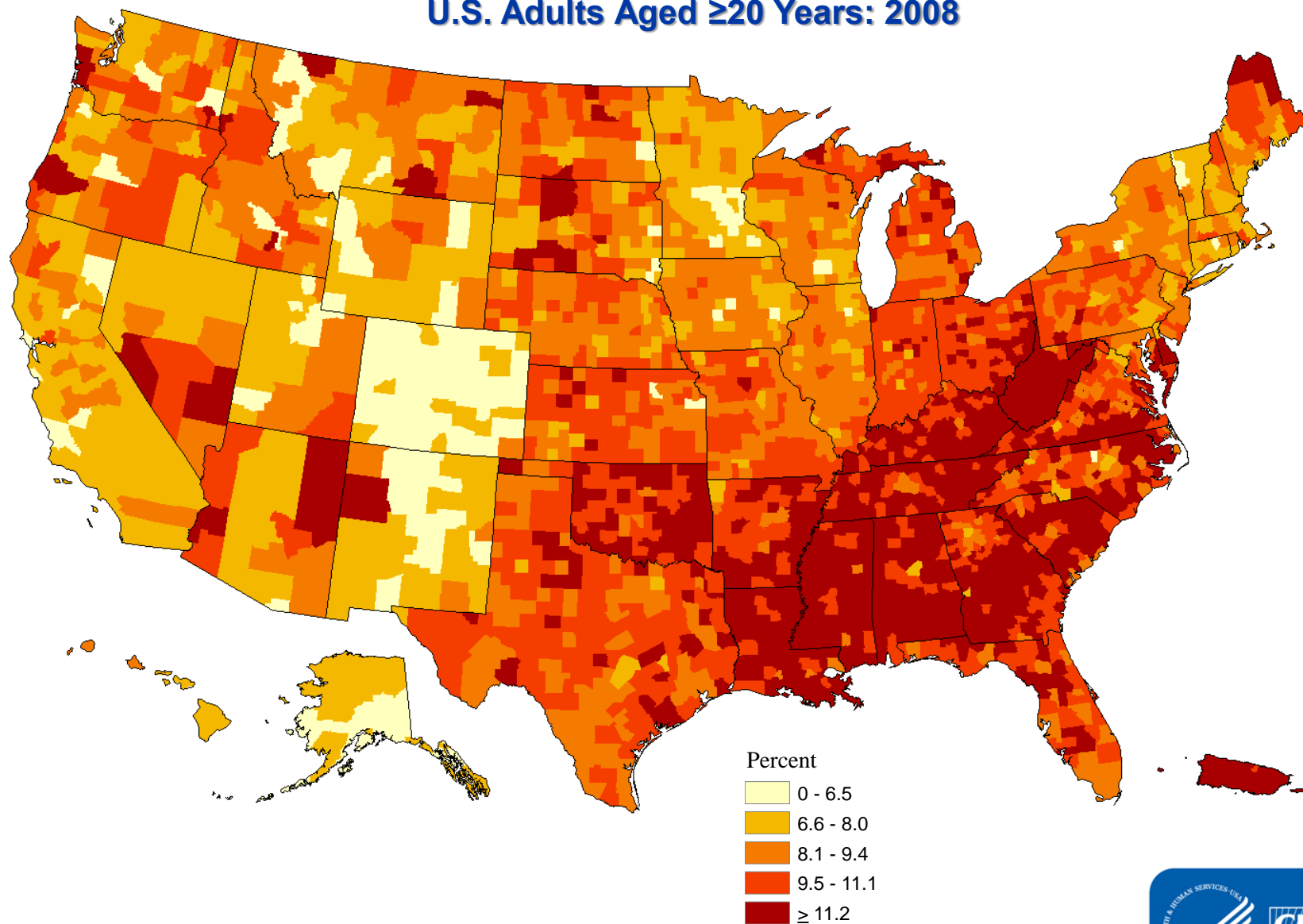
County-Level Estimates of Diagnosed Diabetes Among U.S. Adults Aged ≥ 20 Years: 2006



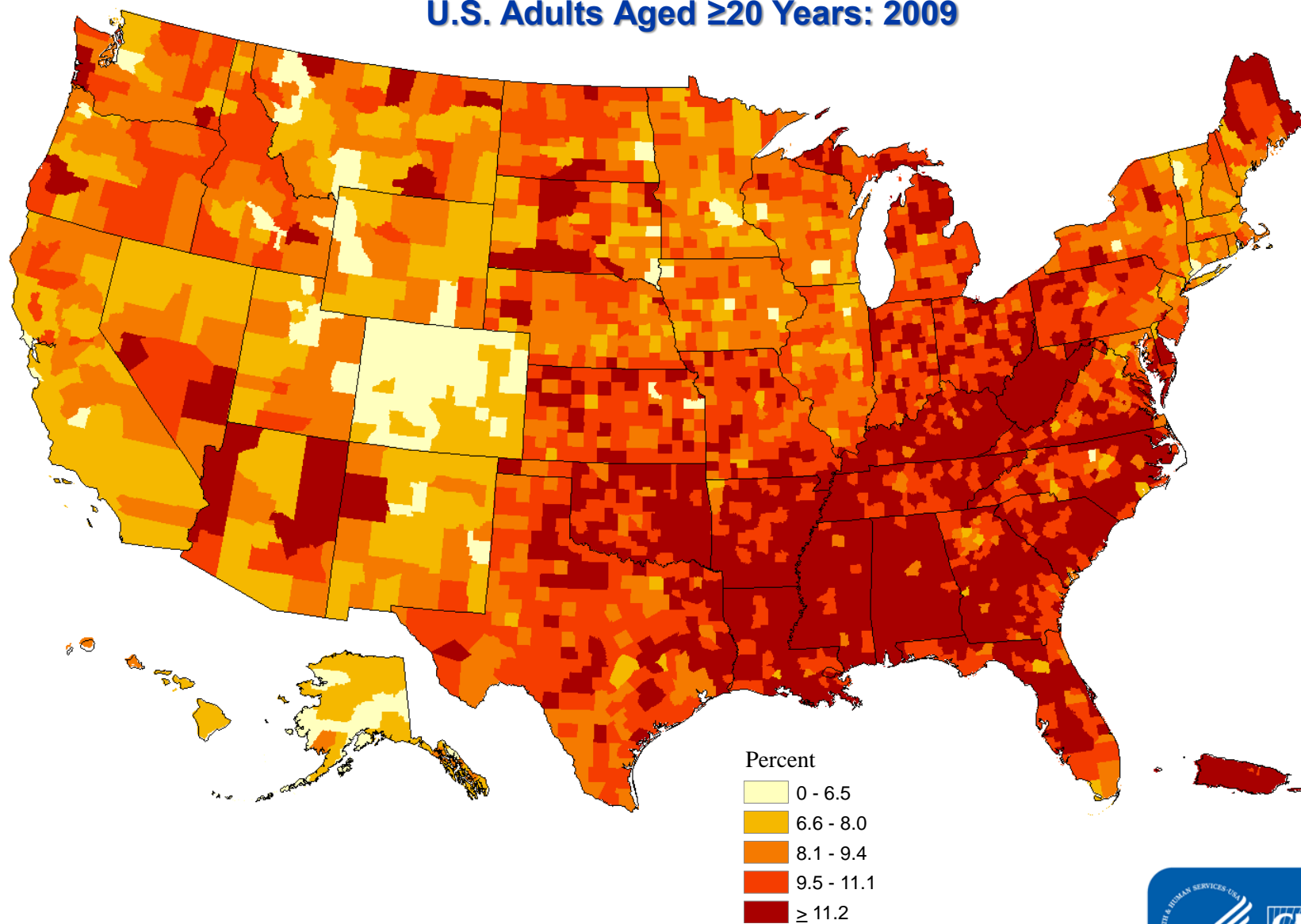
County-Level Estimates of Diagnosed Diabetes Among U.S. Adults Aged ≥ 20 Years: 2007



County-Level Estimates of Diagnosed Diabetes Among U.S. Adults Aged ≥ 20 Years: 2008



County-Level Estimates of Diagnosed Diabetes Among U.S. Adults Aged ≥ 20 Years: 2009



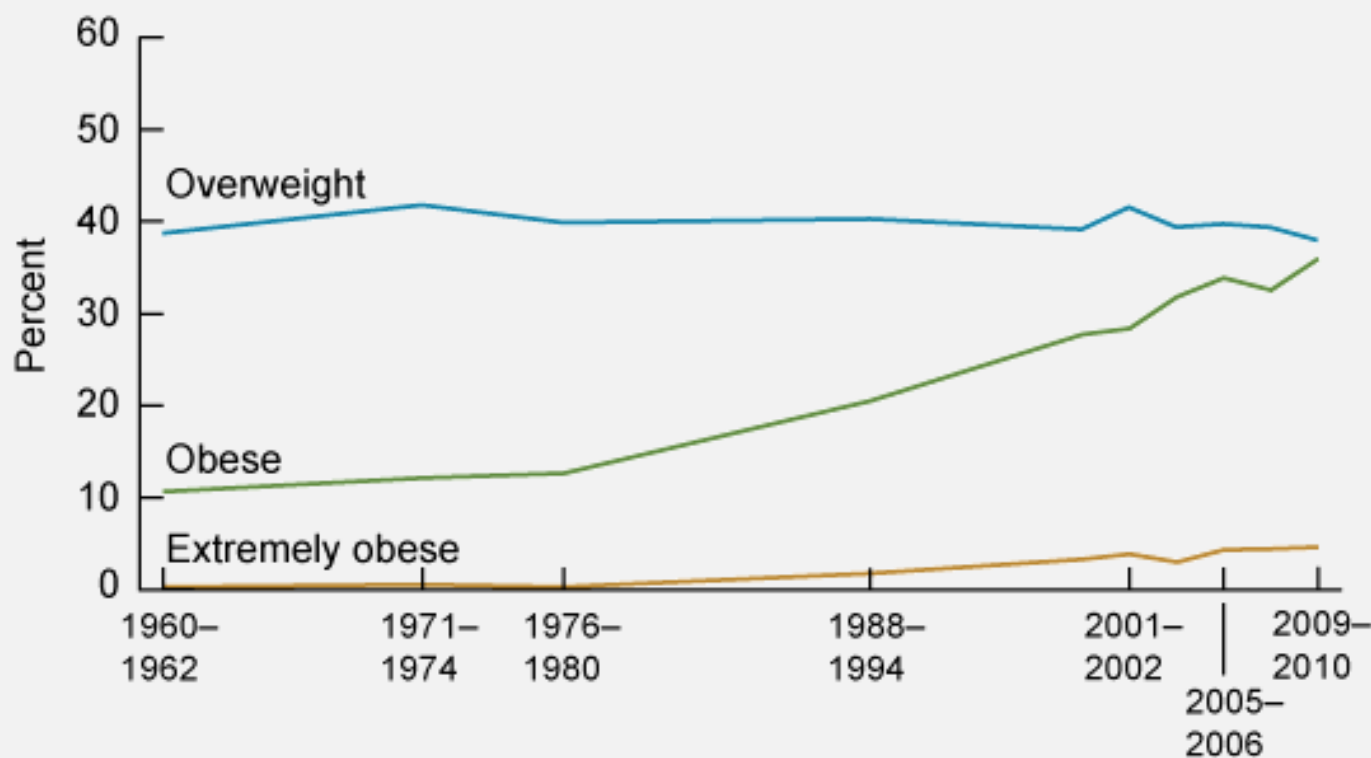
Heart Disease and Strokes: Leading Killers in the United States

- ❑ Cause 1 of every 3 deaths
- ❑ More than 1 of 3 (83 million) U.S. adults currently lives with one or more types of cardiovascular disease.
- ❑ Over 2 million heart attacks and strokes each year
- ❑ \$444 B in health care costs and lost productivity
- ❑ Greatest contributor to racial disparities in life expectancy



Roger VL, et al. Circulation 2012;125:e2-e220
Heidenreich PA, et al. Circulation 2011;123:933-4

Prevalence of Overweight, Obesity, and Extreme Obesity Among Adults: United States, Trends 1960–1962 Through 2009–2010

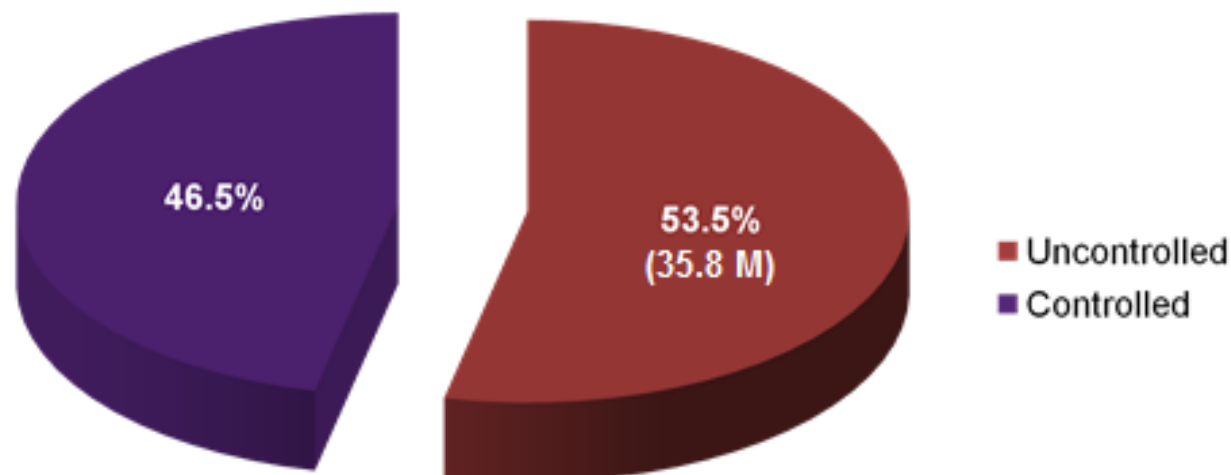


NATIONAL CENTER FOR HEALTH STATISTICS



Fewer than Half of Americans with Hypertension Have It Under Control

67 MILLION
ADULTS WITH HYPERTENSION (30.4%)



The Burden of Diabetes, Heart Disease, and Stroke in Maine

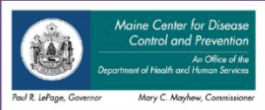


Diabetes Surveillance Report, Maine 2012



UNIVERSITY OF
SOUTHERN MAINE

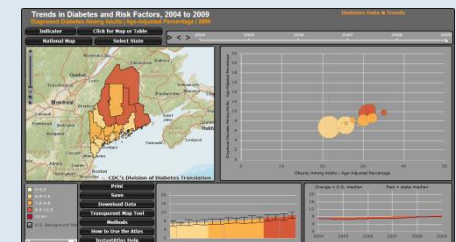
Portland • Gorham • Lewiston • Online
usm.maine.edu



The Burden of Cardiovascular Disease in Maine 2012



Diabetes Report Card 2012



National Center for Chronic Disease Prevention and Health Promotion
Division of Diabetes Translation



The Burden of Diabetes in Maine

Trends in Incidence of Diagnosed Diabetes among Adults, Maine, 1996 - 2010

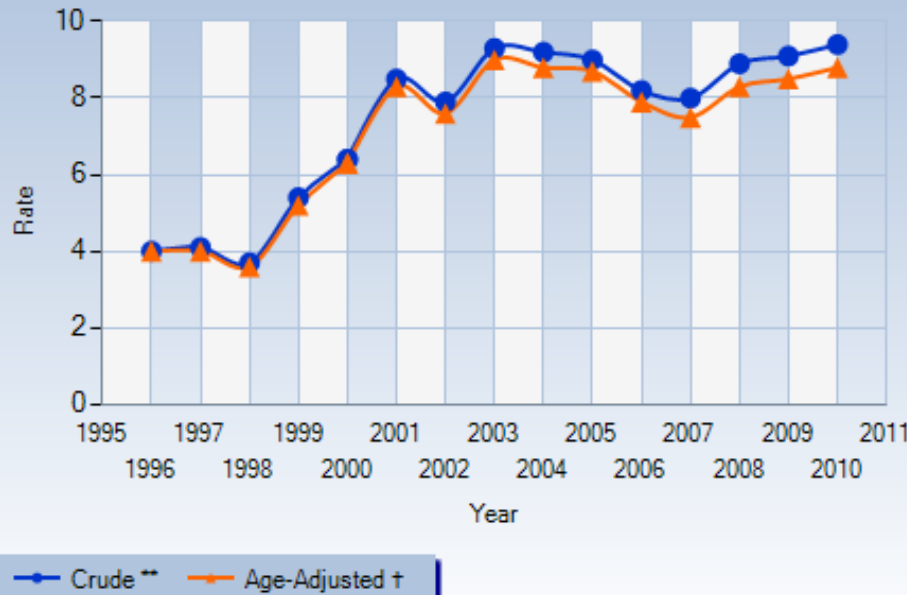
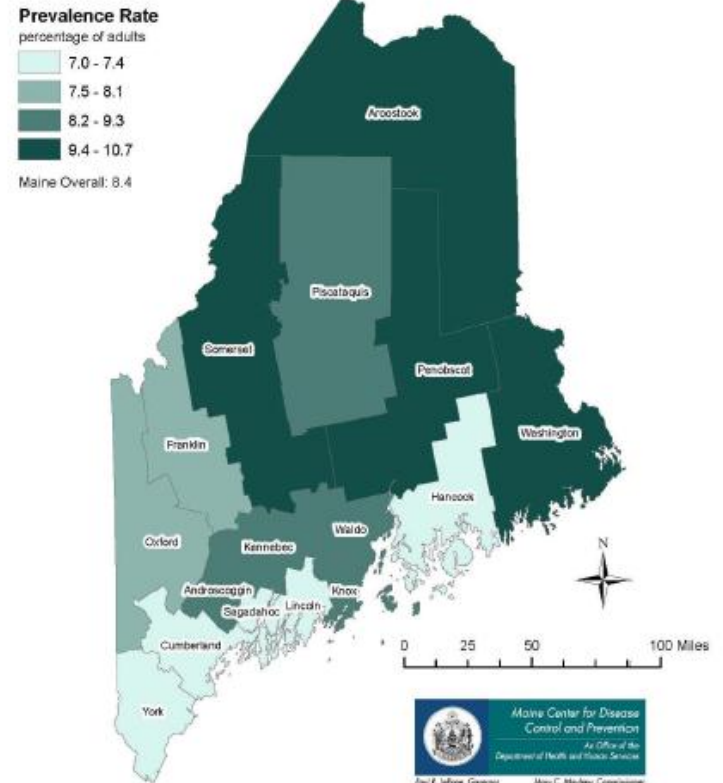


Figure 1.9 Diabetes Prevalence by County of Residence, Maine Adults, 2008-2010



Data Source: Behavioral Risk Factor Surveillance System.
All %s are weighted to be more representative of the general adult population of Maine and to adjust for non-response.
Diabetes does not include pregnancy-related diabetes.
Map Created by David Pied and Nisha Kini on 04/18/2012

Burden of Heart Disease, Stroke, and Related Risk Factors in Maine

Figure 1.2. Major Cardiovascular Disease Death Rates by Year, Maine and U.S., 1993-2009

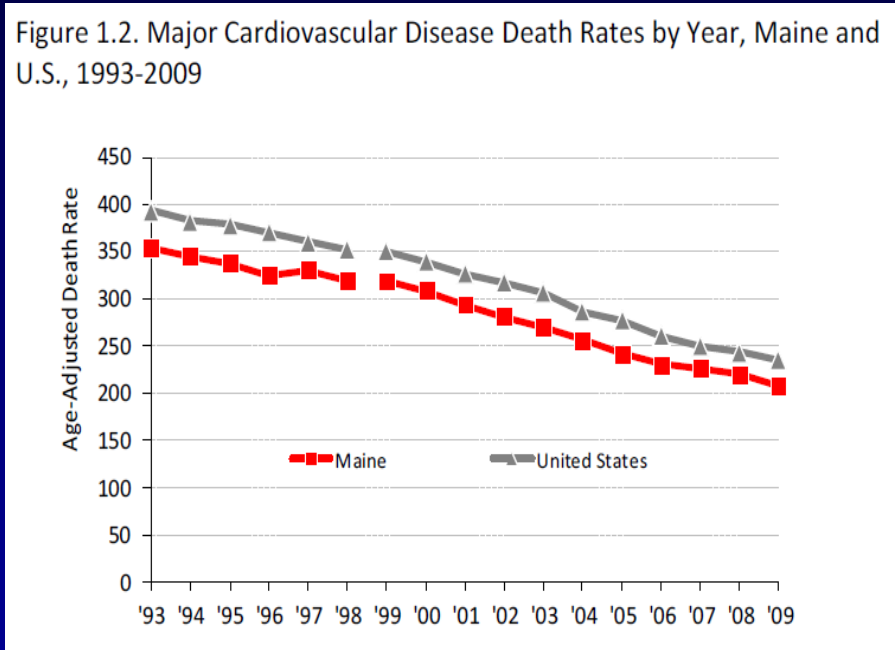
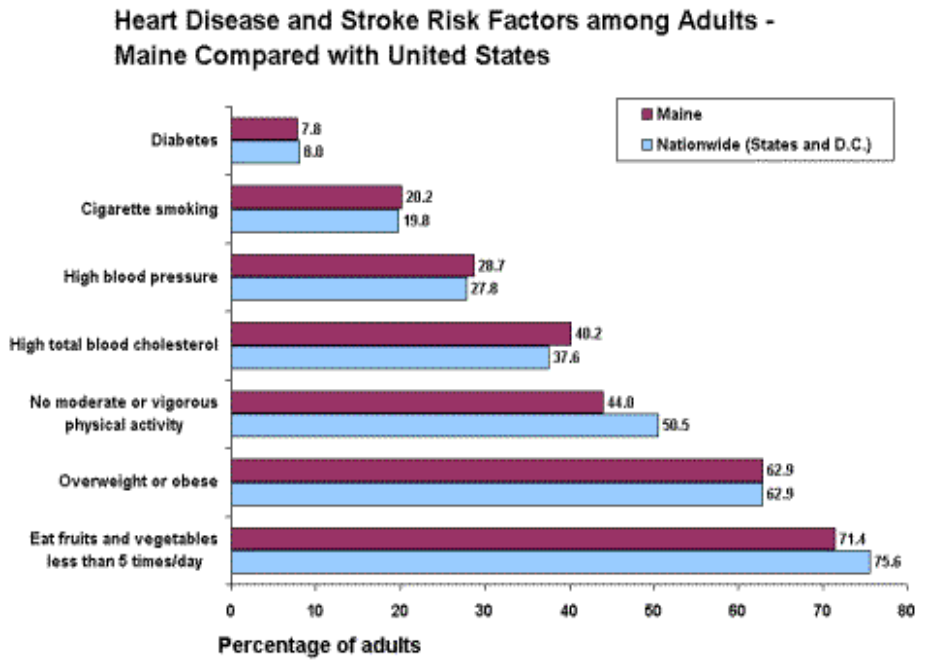
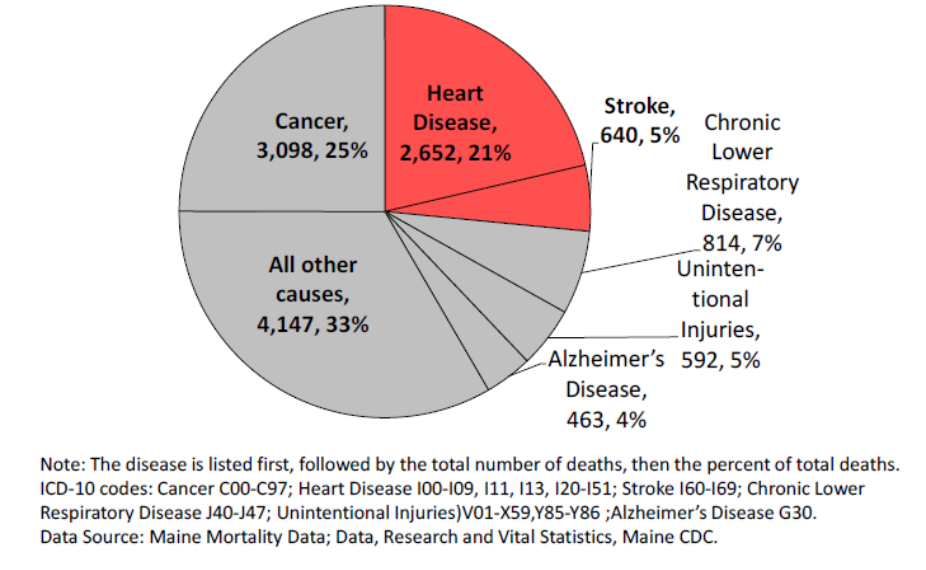


Figure 1.1. CVD and Leading Causes of Death, Maine, 2009



Diabetes:



Heart Disease
And Stroke

Undiagnosed
Diabetes

Dysglycemia

“Pre-diabetes”

Untreated
and / or

Un-detected
Risk Factors

and
Sub-clinical
Disease

Primary Modifiable Risk Factors

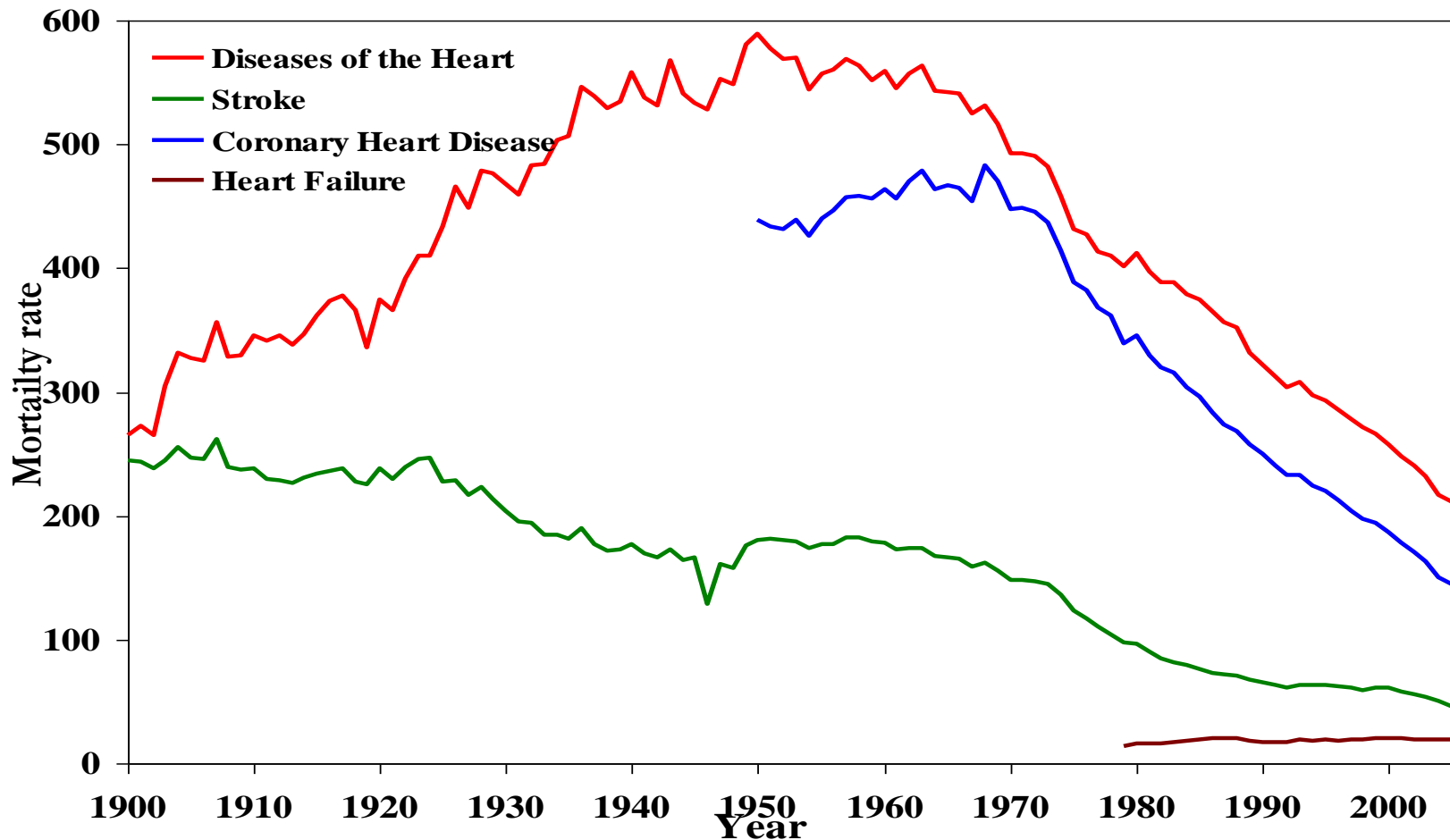
Diabetes

- Central Obesity
- Physical Inactivity
- Sugared Beverages
- Hypertension
- Unhealthy dietary fat
- Inadequate nuts, grains, fruits, vegetables
- Smoking
- Very low birth weight
- Poor Sleep
- Depression

Cardiovascular Disease

- Smoking
- High LDL cholesterol
- Hypertension
- Physical Inactivity
- High Blood Glucose
- Central Obesity
- Unhealthy dietary fat
- Excess salt intake
- Chronic kidney disease
- Psychosocial Stress
- Very low birth weight

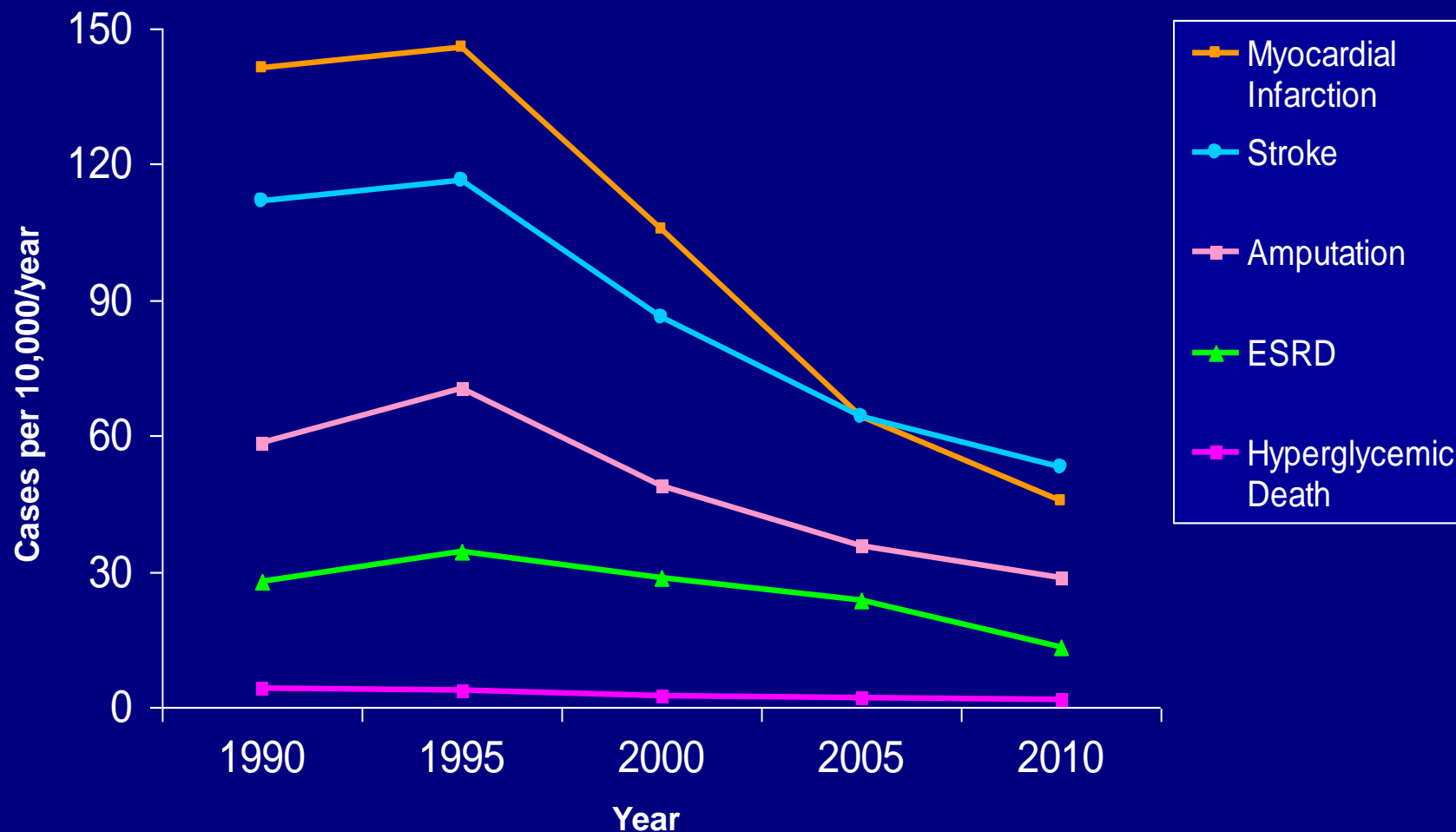
What can we learn from the epidemiologic trends in chronic diseases and related risk factors?



Deaths/100,000 from heart disease and stroke, United States, 1900-2005.

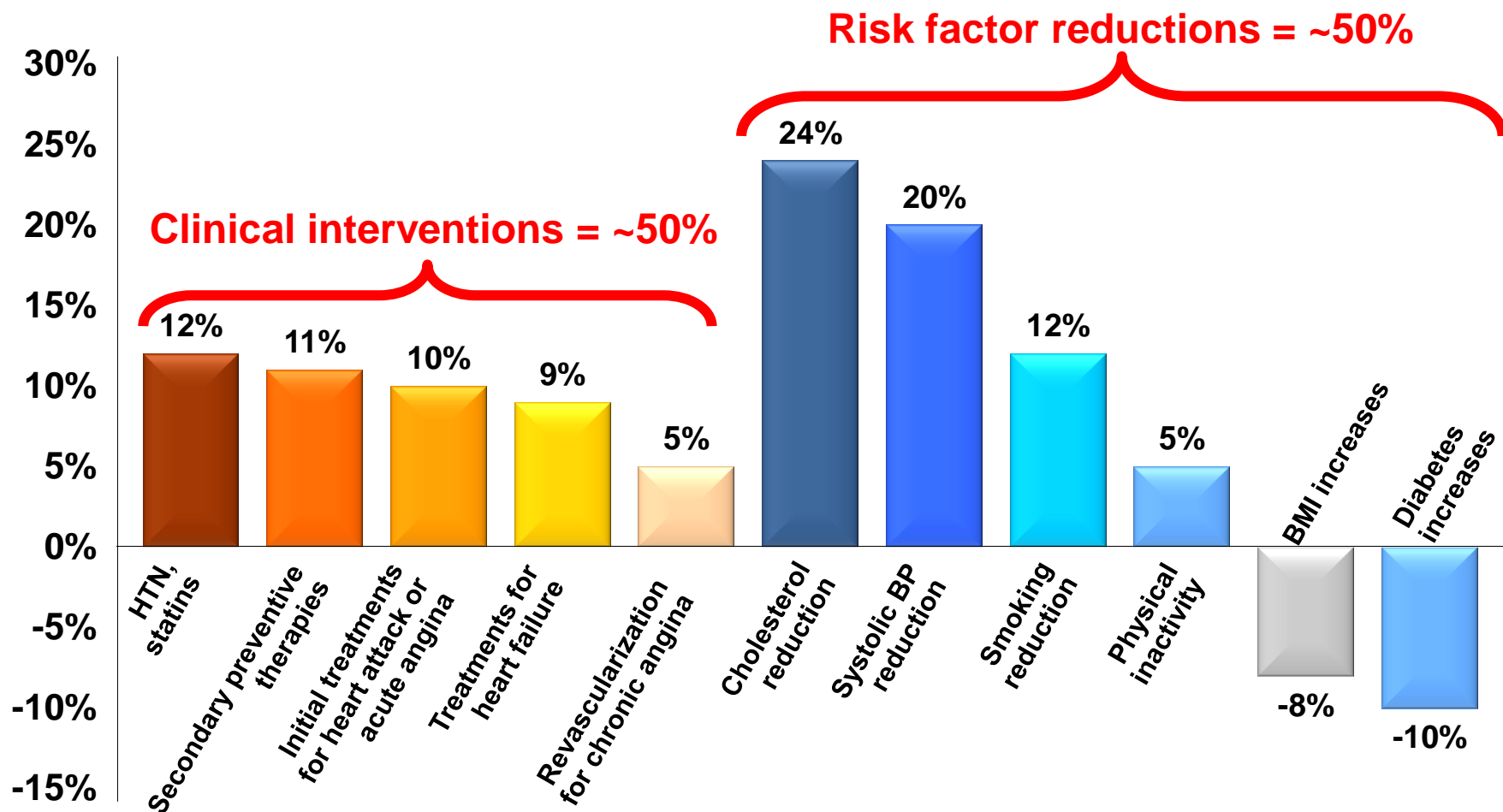
Sources: 1900 – 1978: NCHS Vital Statistics historical tabulated data; 1979-2005: CDC Wonder.

Trends in Annual Incidence of Diabetes Related Complications Over 2 Decades Among U.S. Adults with Diabetes



Clinical and Public Health Progress

Each Contributed About Half to the 50% Reduction in Heart Disease Deaths, US, 1980–2000



Ford ES, et al. NEJM 2007;356(23):2388-97

HTN, Hypertension

BP, Blood pressure

BMI, Body mass index

SPECIAL ARTICLE

Achievement of Goals in U.S. Diabetes Care, 1999–2010

Mohammed K. Ali, M.B., Ch.B., M.B.A., Kai McKeever Bullard, M.P.H., Ph.D.,
Jinan B. Saaddine, M.D., M.P.H., Catherine C. Cowie, M.P.H., Ph.D.,
Giuseppina Imperatore, M.D., Ph.D., and Edward W. Gregg, Ph.D.

Greatest Improvements in targets for:

- Lipid Levels: 20.8 % points
- Blood pressure: 11.7 % points
- Glycemic control: 9.4 % points

Remaining Concerns:

- 33 to 48% did not meet targets.
- No improvement in tobacco.
- Only 14% met targets for all 4.

Table 3. Changes in Risk-Factor Control and Adherence to Preventive Practices over Time among U.S. Adults with Diagnosed Diabetes.*

Factor or Practice				Change from 1999–2002 to 2007–2010 (95% CI)	Change from 2003–2006 to 2007–2010 (95% CI)
	1999–2002	2003–2006	2007–2010	% of survey participants	percentage points
Risk factors					
Glycated hemoglobin					
>9.0%	18.4	13.0	12.6	–5.8 (–10.5 to –1.1)	–0.4 (–3.8 to 3.0)
<8.0%	67.4	78.0	79.1	11.7 (6.3 to 17.1)	1.1 (–3.5 to 5.7)
<7.0%	44.3	56.8	52.2	7.9 (0.8 to 15.0)	–4.6 (–11.1 to 1.9)
Blood pressure <130/80 mm Hg	39.6	45.3	51.3	11.7 (5.7 to 17.7)	6.0 (0.4 to 11.6)
LDL cholesterol†					
<100 mm Hg	36.0	46.6	56.8	20.8 (11.6 to 30.0)	10.2 (2.5 to 17.9)
<70 mm Hg for persons with CVD	15.9	23.2	27.5	11.6 (–4.1 to 27.3)	4.3 (–8.5 to 17.1)
Current smoker, self-reported or cotinine >10 ng/ml	24.0	23.4	22.3	–1.7 (–6.2 to 2.8)	–1.1 (–5.4 to 3.2)
Glycated hemoglobin, blood-pressure, and LDL cholesterol targets and nonsmoking status achieved	4.6	9.5	14.3	9.7 (5.1 to 14.3)	4.8 (–0.4 to 10.0)
Preventive practices					
Annual lipid measurement	82.7	86.3	88.2	5.5 (1.6 to 9.4)	1.9 (–2.0 to 5.8)
Annual examinations					
Eye	75.1	72.6	73.4	–1.7 (–3.7 to 0.3)	0.8 (–0.7 to 2.3)
Foot	64.6	67.6	71.4	6.8 (4.8 to 8.8)	3.8 (2.1 to 5.5)
Dental	64.3	60.0	62.5	–1.8 (–6.8 to 3.2)	2.5 (1.0 to 4.0)
Diabetes education	49.3	53.2	54.6	5.3 (3.0 to 7.6)	1.4 (–0.4 to 3.2)
Blood glucose monitoring ≥ once daily	58.2	67.3	70.9	12.7 (10.3 to 15.1)	3.6 (1.9 to 5.3)
Vaccinations					
Annual influenza	55.5	56.8	60.0	4.5 (0.8 to 8.2)	3.2 (1.4 to 5.0)
Pneumococcal	42.1	48.3	49.0	6.9 (3.4 to 10.4)	0.7 (–1.0 to 2.4)
ACE or ARB, if ACR ≥30 mg/g‡	45.0	58.1	64.0	19.0 (10.0 to 28.0)	5.9 (–2.2 to 14.0)
Annual influenza vaccination and eye and foot examinations received	11.5	27.3	22.4	10.9 (9.3 to 12.5)	–4.9 (–6.3 to 3.5)
Risk of complications					
Free of microalbuminuria: ACR <30 mg/g	65.8	69.3	69.8	4.0 (0.0 to 8.0)	0.5 (–3.8 to 4.8)
10-yr risk of CHD					
UKPDS risk score	20.6	16.5	16.9	–3.7 (–6.0 to –1.4)	0.4 (–1.7 to 2.5)
Framingham Heart Study risk score	18.6	16.2	15.8	–2.8 (–4.5 to –1.1)	–0.4 (–1.9 to 1.1)

* Data for risk-factor control are from the NHANES 1999–2002, 2003–2006, and 2007–2010 surveys and data for preventive practices are from the BRFSS 2000, 2004, and 2008 surveys. The data are presented as weighted percentages of survey participants, with the exception of the 10-year risk of coronary heart disease (CHD), for which risk scores are provided. UKPDS denotes United Kingdom Prospective Diabetes Study.

† The values for LDL cholesterol, which were calculated with the use of the Friedewald formula (for all cases in which the triglyceride level was <400 mg per deciliter [4.5 mmol per liter]), are from a subsample of 1310 participants who fasted before testing.

‡ These data were based on self-report and the NHANES Medical Drug Inventory.

General Trends in Secondary and Primary Prevention of Cardiometabolic Disease

Relative Successes: Secondary Prevention and Control of Risk Factors

- CVD Mortality
 - MI, Stroke
- Diabetes Complications
 - Amputations
 - Acute
 - ESRD
- CVD Risk Factors
 - HTN control
 - Lipids
 - Smoking
- Preventive Care



1990 1995 2000 2005 2010

Challenges in Primary Prevention

- Diabetes Incidence
- Obesity
- Cardiometabolic risk in youth



1990 1995 2000 2005 2010

Status Unclear: Hypertension
Chronic Kidney Disease
Disparities in Vulnerable Groups

- Why are we here *together*? (i.e., diabetes and CVD?)
 - We're both important.
 - We share a large, common constituency.
 - We share many, common, highly modifiable risk factors.
 - We both have some important past successes.
 - Evolving science points us toward some key synergistic approaches.
- What are the most effective, synergistic public health approaches for diabetes and cardiovascular disease prevention and control?

Classic Public Health Avenues for Prevention of Cardiovascular Disease

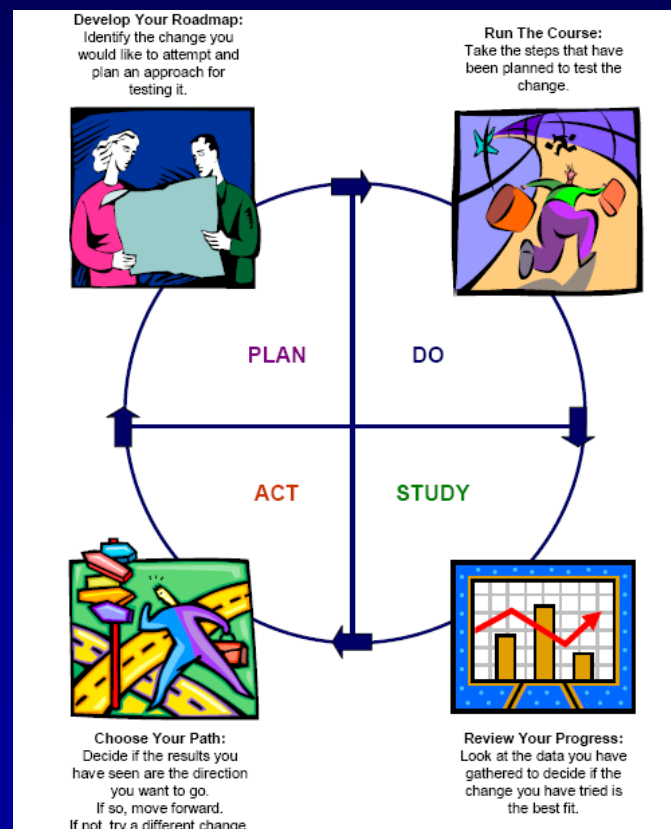
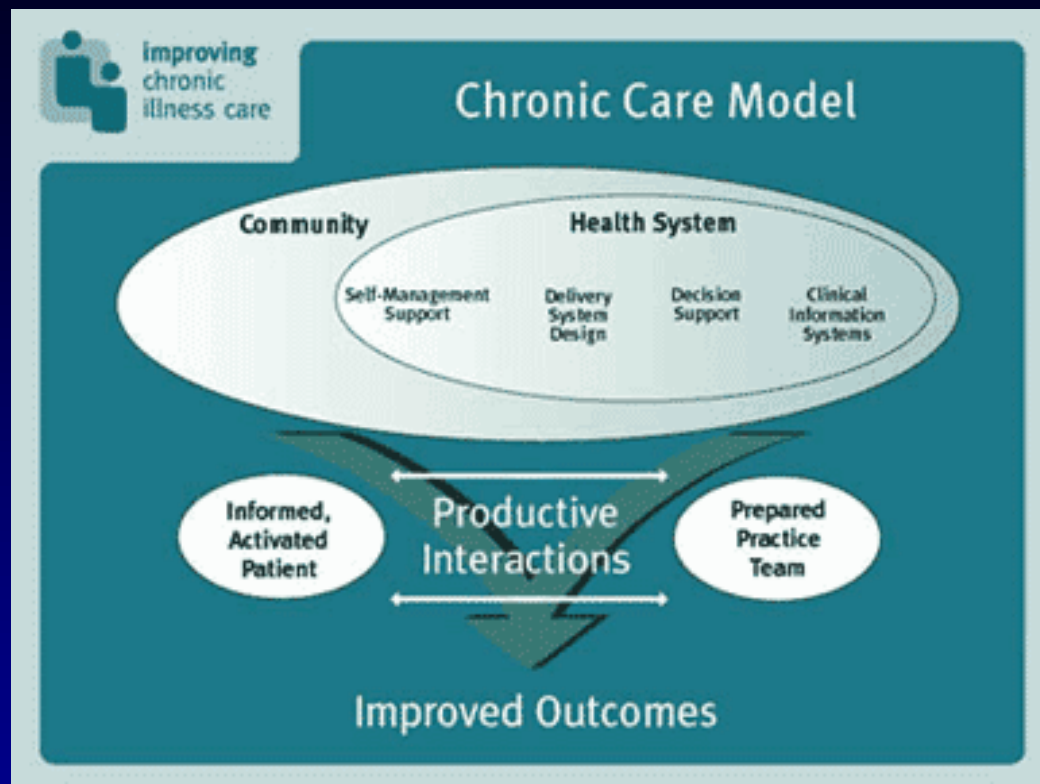
- BP control
- Lipid control
- Smoking Cessation
- Glycemic Control
- Targeted screening



- Healthy Diet
- Physical activity
- Med Adherence
- Smoking Cessation



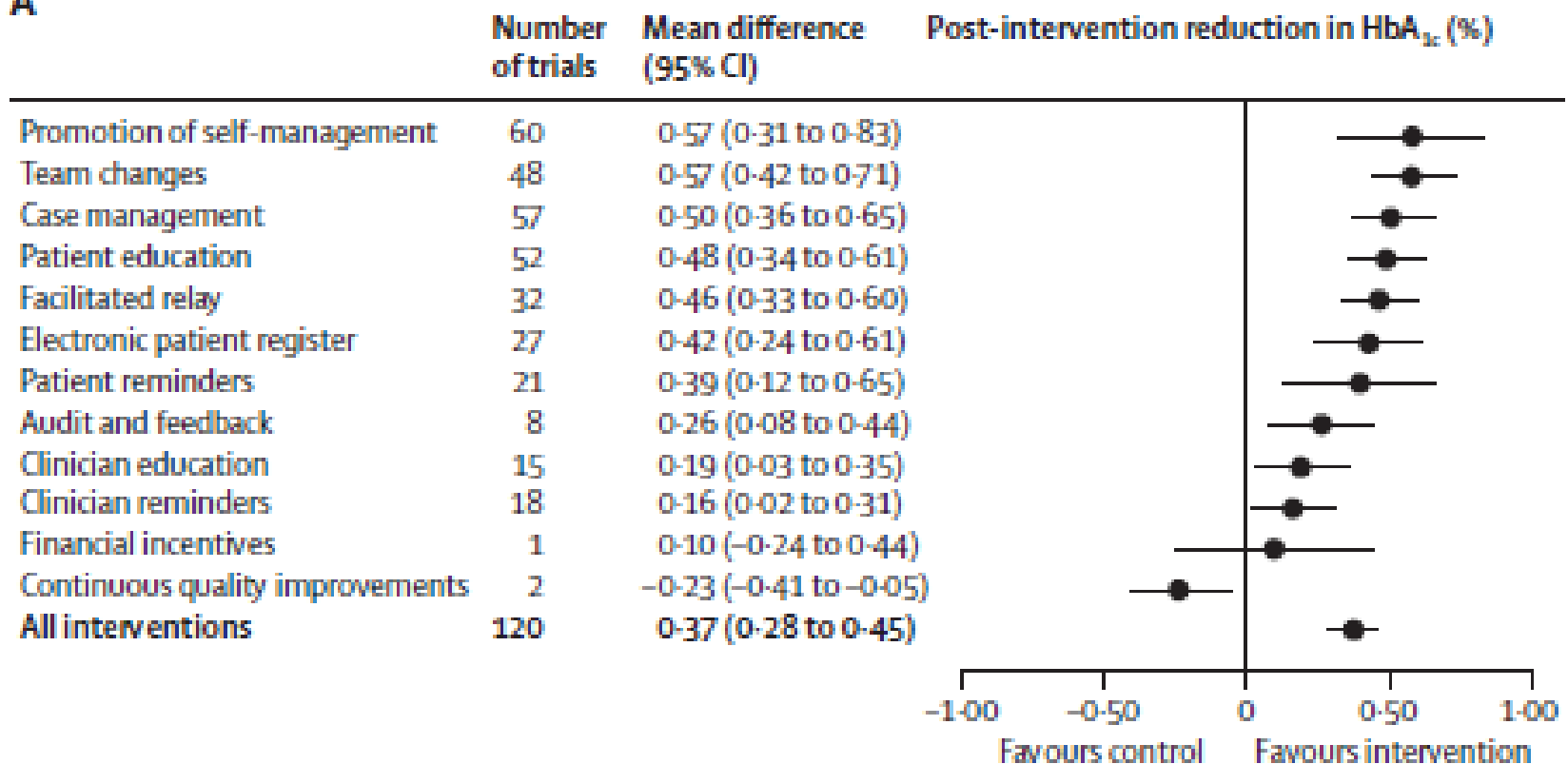
Where gaps remain, stimulate, support, and facilitate team-based prevention and care.



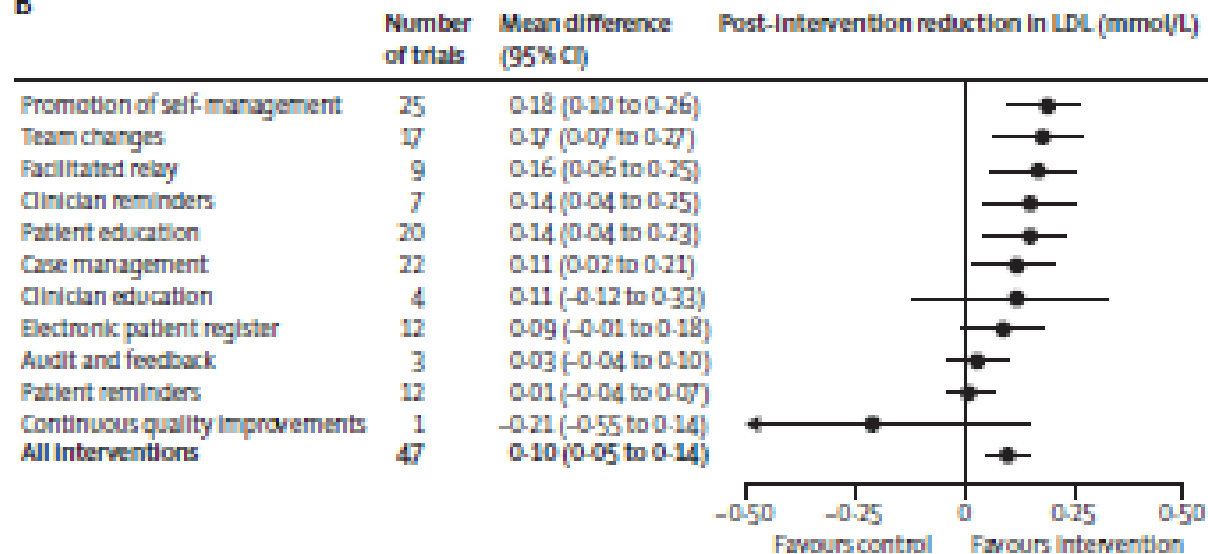
Effectiveness of quality improvement strategies on the management of diabetes: a systematic review and meta-analysis

Andrea C Tricco, Noah M Ivers, Jeremy M Grimshaw, David Moher, Lucy Turner, James Galipeau, Ilana Halperin, Brigitte Vachon, Tim Ramsay, Braden Manns, Marcello Tonelli, Kaveh Shojania

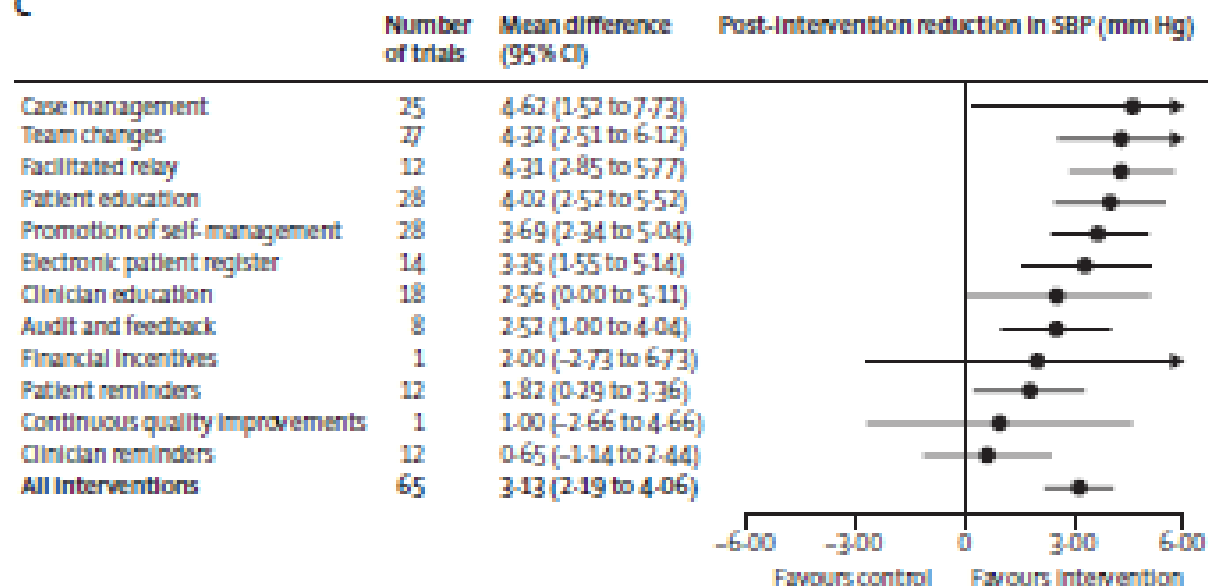
A



B



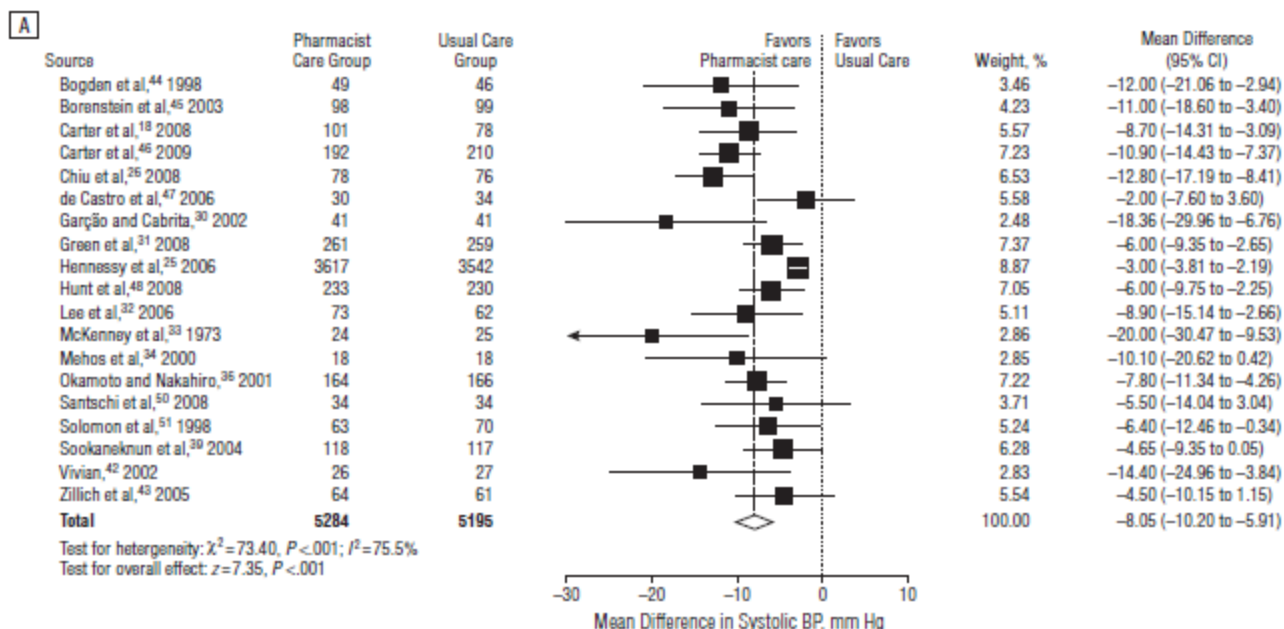
C



Impact of Pharmacist Care in the Management of Cardiovascular Disease Risk Factors

A Systematic Review and Meta-analysis of Randomized Trials

Valérie Santschi, PharmD, PhD; Arnaud Chiolerio, MD, MSc; Bernard Burnand, MD, MPH;
April L. Colosimo, MSc, MLIS; Gilles Paradis, MD, MSc



Develop and support effective models of self-management.

STANDARDS AND REVIEW CRITERIA

National Standards for Diabetes Self-Management Education

MARITHA M. FUNNELL, MS, RN, CDE¹
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GWEN M. HOSEY, MS, ARNP, CDE⁵
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KATIE WEINGER, EDD, RN⁷
MICHAEL A. WEISS, JD¹³

Diabetes self-management education (DSME) is a critical element of care for all people with diabetes and is necessary in order to improve patient outcomes. The National Standards for DSME are designed to define quality diabetes self-management education and to assist diabetes educators in a variety of settings to provide evidence-based education. Because of the dynamic nature of health care and diabetes-related research, these Standards are reviewed and revised approximately every 5 years by key organizations and federal agencies within the diabetes education community.

A Task Force was jointly convened by the American Association of Diabetes Educators and the American Diabetes Association in the summer of 2006. Additional organizations that were represented included the American Dietetic Association, the Veteran's Health Administration, the Centers for Disease Control and Prevention, the Indian Health Service, and the American Pharmaceutical Association. Members of the Task Force included a person with diabetes; several health services researchers/behaviorists, registered nurses, and registered dietitians; and a pharmacist.

The Task Force was charged with reviewing the current DSME standards for

their appropriateness, relevance, and scientific basis. The Standards were then reviewed and revised based on the available evidence and expert consensus. The committee convened on 31 March 2006 and 9 September 2006, and the Standards were approved 25 March 2007.

DEFINITION AND OBJECTIVES

Diabetes self-management education (DSME) is the ongoing process of facilitating the knowledge, skill, and ability necessary for diabetes self-care. This process incorporates the needs, goals, and life experiences of the person with diabetes and is guided by evidence-based standards. The overall objectives of DSME are to support informed decision-making, self-care behaviors, problem-solving and active collaboration with the health care team and to improve clinical outcomes, health status, and quality of life.

GUIDING PRINCIPLES— Before the review of the individual Standards, the Task Force identified overriding principles based on existing evidence that would be used to guide the review and revision of the DSME Standards. These are:

1. Diabetes education is effective for improving clinical outcomes and quality of life, at least in the short-term (1–7).
2. DSME has evolved from primarily didactic presentations to more theoretically based empowerment models (3,8).
3. There is no one “best” education program or approach; however, programs incorporating behavioral and psychosocial strategies demonstrate improved outcomes (9–11). Additional studies show that culturally and age-appropriate programs improve outcomes (12–16) and that group education is effective (4,6,7,17,18).
4. Ongoing support is critical to sustain progress made by participants during the DSME program (3,13,19,20).
5. Behavioral goal-setting is an effective strategy to support self-management behaviors (21).

STANDARDS

Structure

Standard 1. The DSME entity will have documentation of its organizational structure, mission statement, and goals and will recognize and support quality DSME as an integral component of diabetes care.

Documentation of the DSME organizational structure, mission statement, and goals can lead to efficient and effective provision of services. In the business literature, case studies and case report investigations on successful management strategies emphasize the importance of clear goals and objectives, defined relationships and roles, and managerial support (22–25). While this concept is relatively new in health care, business and health policy experts and organizations have begun to emphasize written commitments, policies, support, and the importance of outcome variables in quality improvement efforts (22,26–37). The continuous quality improvement literature also stresses the importance of developing policies, procedures, and guidelines (22,26).

Documentation of the organizational structure, mission statement, and goals can lead to efficient and effective provision of DSME. Documentation of an organizational structure that delineates



Self-Measured Blood Pressure Monitoring



ACTION STEPS for Public Health Practitioners

A MILLION HEARTS™ ACTION GUIDE

The previous version of the “National Standards for Diabetes Self-Management Education” was originally published in *Diabetes Care* 23:682–689, 2000. This version received final approval in March 2007.

From the ¹Department of Medical Education, Diabetes Research and Training Center, University of Michigan, Ann Arbor, Michigan; ²Indian Health Service, Albuquerque, New Mexico; ³MidAmerica Diabetes Associates, Wichita, Kansas; ⁴VA Puget Sound Health Care System, Seattle, Washington; ⁵Division of Diabetes Translation, National Center for Chronic Diseases Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, Georgia; ⁶Lakeshore Apothecary, Two Rivers, Wisconsin; ⁷Joslin Diabetes Center, Harvard Medical School, Boston, Massachusetts; ⁸Loyola College, Baltimore, Maryland; ⁹VA Ann Arbor Health Care System, Ann Arbor, Michigan; ¹⁰Department of Internal Medicine, Diabetes Research and Training Center, University of Michigan, Ann Arbor, Michigan; ¹¹International Diabetes Center, Minneapolis, Minnesota; ¹²Diabetes Institute, University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania; and ¹³Patient Centered Solutions, Pittsburgh, Pennsylvania.

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DOI: 10.2337/dc10-S089

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Elements and Impact of Self-Management Education for Diabetes and Hypertension

- Small group attention.
- Knowledge, skills, and ability.
- Active Collaboration
- Problem solving
- Tailored to individual differences
- Ongoing Support
- Behavioral Goal Setting

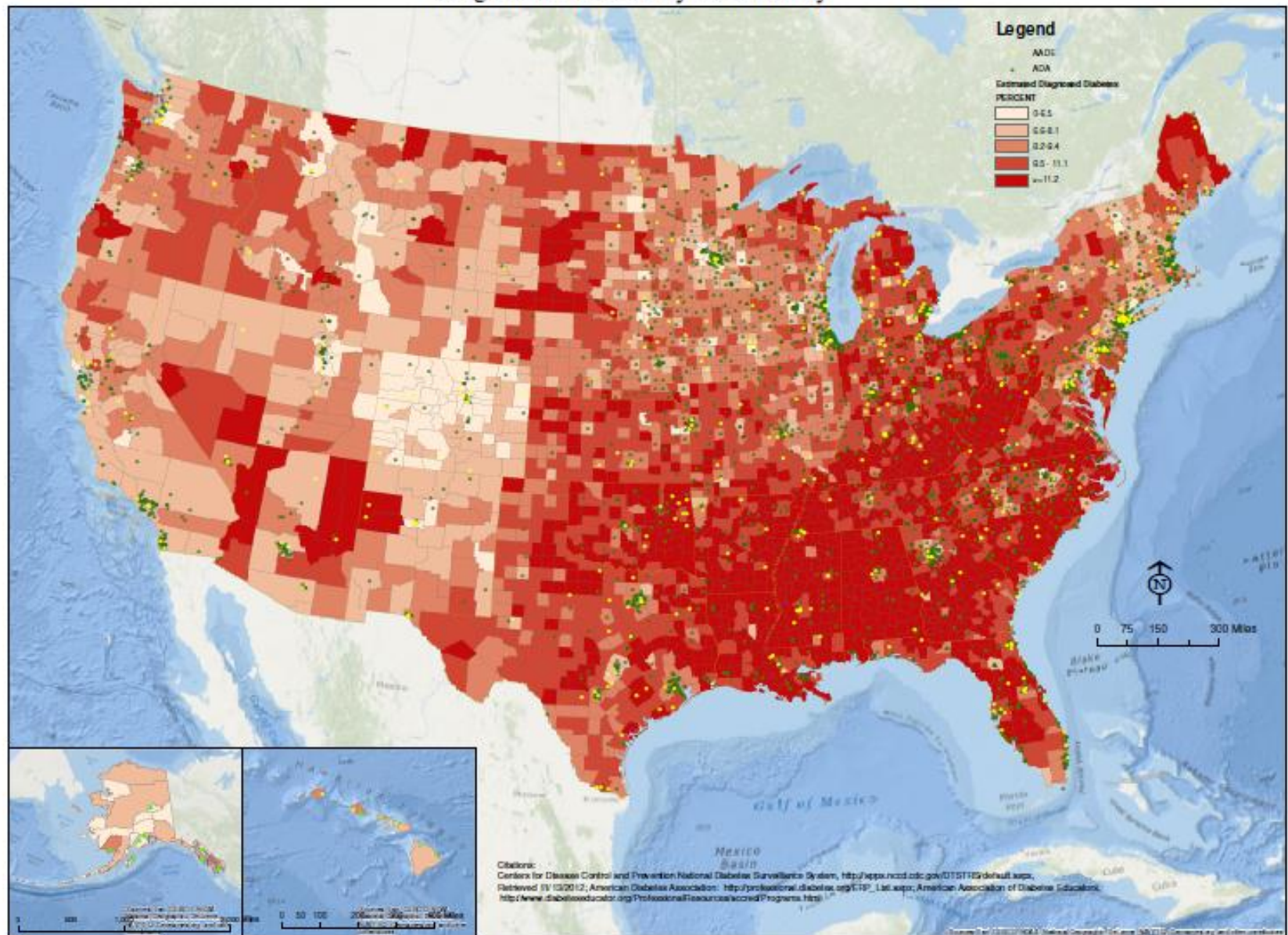


- Glycemic Control
- Blood pressure control
- Healthy Behaviors
- Preventive Screening

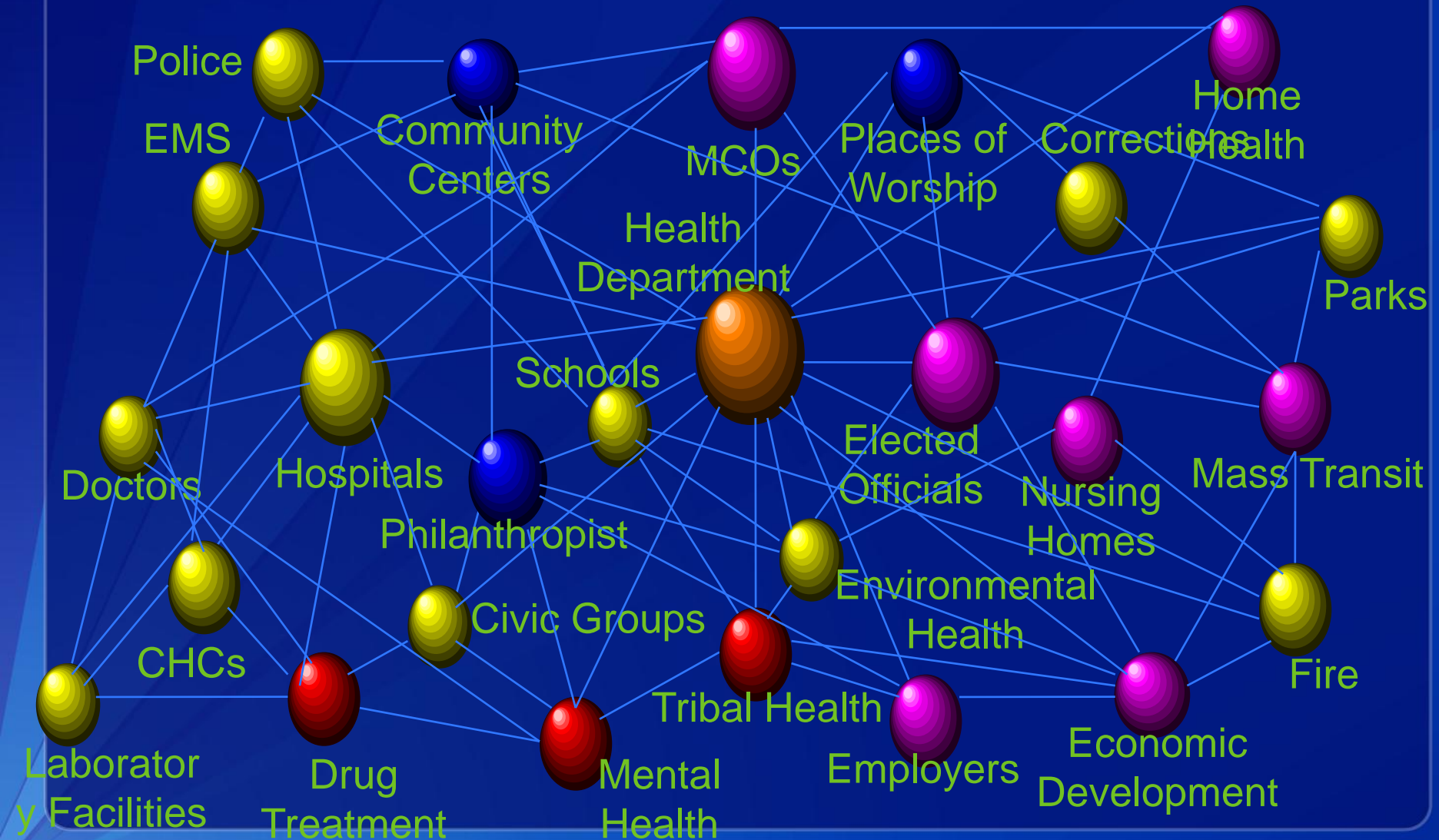


- Clinical Outcomes
- Health Status
- Quality of Life

Diabetes Self-Management Education Programs Overlaid with Estimated Percent of Adults Age ≥ 20 Years Old with Diagnosed Diabetes By U.S. County

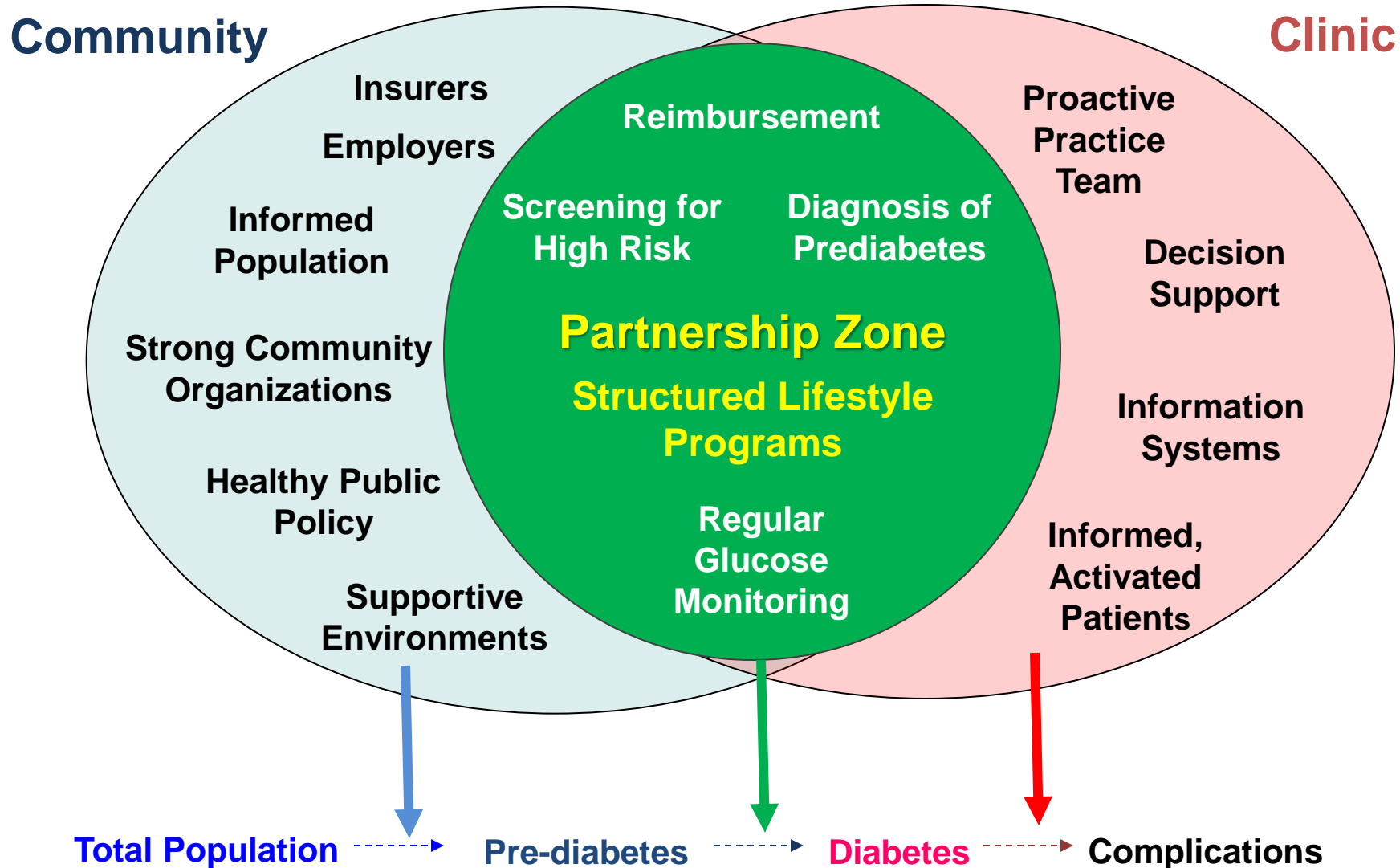


Building effective networks and clinical-community partnerships.



The National Diabetes Prevention Program

A Community–Clinic–Payer–Agency Partnership Model



The National Diabetes Prevention Program:
**A Public-private partnership to systematically scale the translated
model of the DPP.**

National Diabetes Prevention Program

COMPONENTS



Training: Increase Workforce

Train the workforce that can implement the program cost effectively.



Recognition Program: Assure Quality

Implement a recognition program that will:

- Assure quality.
- Lead to reimbursement.
- Allow CDC to develop a program registry.



Intervention Sites: Deliver Program

Develop intervention sites that will build infrastructure and provide the program.



Health Marketing: Support Program Uptake

Increase referrals to and use of the prevention program.

Effects of Diet and Exercise in Preventing NIDDM in People With Impaired Glucose Tolerance

The Da Qing IGT and Diabetes Study

XIAO-BEN PAN, MD
GUANG-WEI LI, MD
YING-HUA HU, MD
JI-XING WANG, MD
WEN-YING YANG, M
ZUO-XIN AN, MD
ZE-XI HU, MD
JUAN-LIN, MD
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The New England Journal of Medicine

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VOLUME 344

MAY 3, 2001

NUMBER 18



PREVENTION OF TYPE 2 DIABETES MELLITUS BY CHANGES IN LIFESTYLE
AMONG SUBJECTS WITH IMPAIRED GLUCOSE TOLERANCE

JAAKKO TUOMI
HELENA H.
IV

The New England Journal of Medicine

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VOLUME 346

FEBRUARY 7, 2002

NUMBER 6

Diabetologia (2006) 49: 289–297
DOI 10.1007/s00125-005-0097-z



REDUCTION II

ARTICLE

A. Ramachandran · C. Snehalatha · S. Mary ·
B. Mukesh · A. D. Bhaskar · V. Vijay ·
Indian Diabetes Prevention Programme (IDPP)

The Indian Diabetes Prevention Pro- gramme (IDPP): modification and metformin prevent Indian subjects with impaired gluco

Received: 20 August 2005 / Accepted: 18 October 2005 / Published
© Springer-Verlag 2006

The long-term effect of lifestyle interventions to prevent diabetes in the China Da Qing Diabetes Prevention Study: a 20-year follow-up study

Guangwei Li, Ping Zhang, Jinping Wang, Edward W Gregg, Wenying Yang, Qihong Gong, Hui Li, Hongliang Li, Yayun Jiang, Yali An, Ying Shuai,
Bo Zhang, Jingling Zhang, Theodore J Thompson, Robert B Gerzoff, Gajka Roglic, Yinghua Hu, Peter H Bennett

Summary

Background Intensive lifestyle interventions can reduce the incidence of type 2 diabetes in people with impaired glucose tolerance, but how long these benefits extend beyond the period of active intervention, and whether such interventions reduce the risk of cardiovascular disease (CVD) and mortality, is unclear. We aimed to assess whether intensive lifestyle interventions have a long-term effect on the risk of diabetes, diabetes-related macrovascular and microvascular complications, and mortality.

Lancet 2008; 371: 1783–89

See Comment page 1731

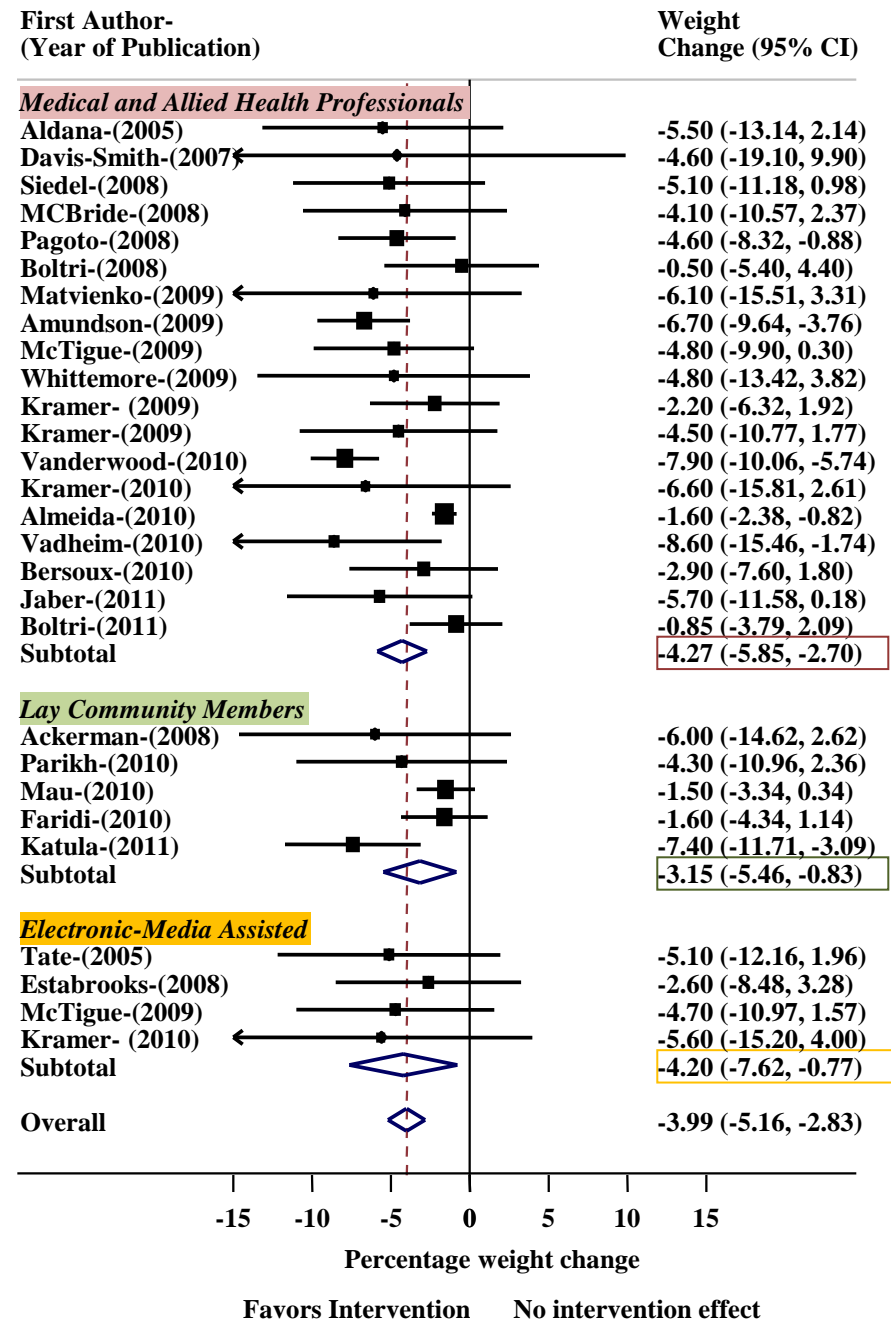
Department of Endocrinology,

China-Japan Friendship

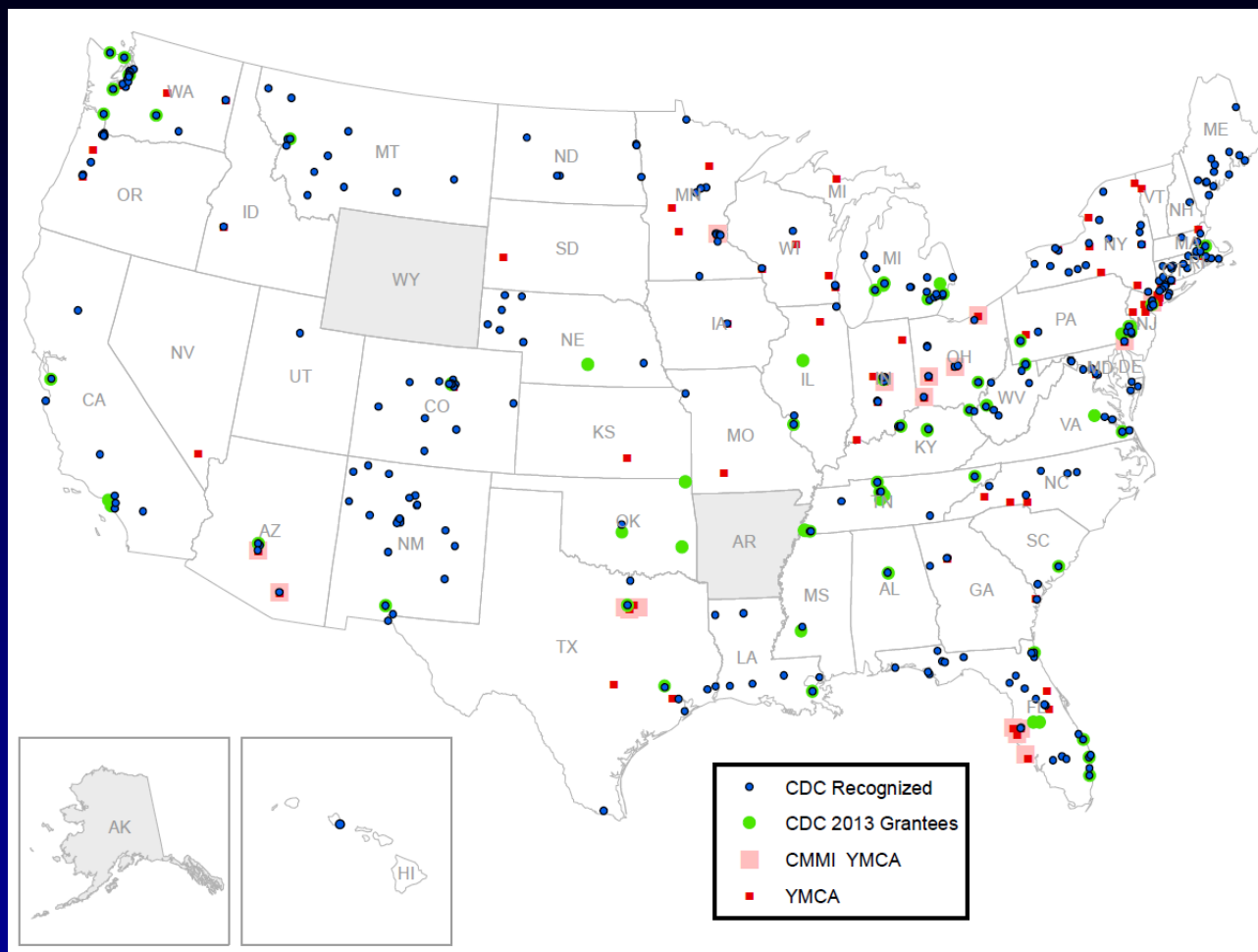
Hospital, Beijing, China

(Roglic) MD, Harvard Medical

- 26 studies of 3797 high risk adults:
- Diverse settings:
12 community (recreation, faith)
11 health care
- Mean weight change: 4%
- Every 4 sessions attended: 1%
percentage point added weight loss
- Aggregate cost: ~ 1000 per person

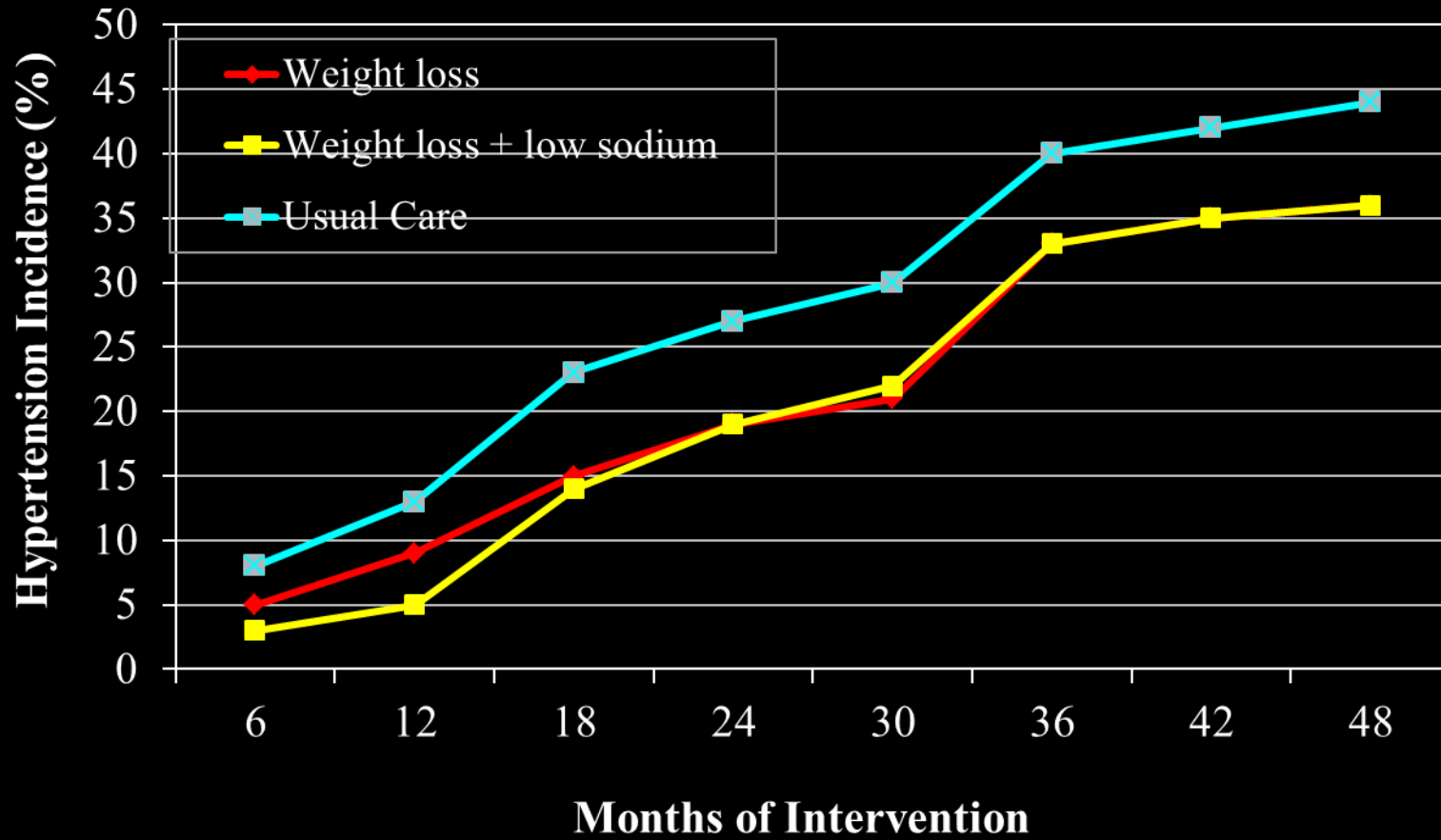


Progress To-date for National Diabetes Prevention Program



- Over 1400 lifestyle coaches trained.
- Over 320 organizations awarded CDC recognition (pending)
- Five private insurers and 280 self-funded employers covering program
- 6 National CDC grantees

Effects of Weight Loss And/or Sodium Restriction on 4-year Hypertension Incidence Among Overweight Individuals Aged 30-54 With High-normal Blood Pressure



(TOHP II Collaborative Research Group, *Arch Intern Med*, 1997)

A Framework for Public Health Action: The Health Impact Pyramid

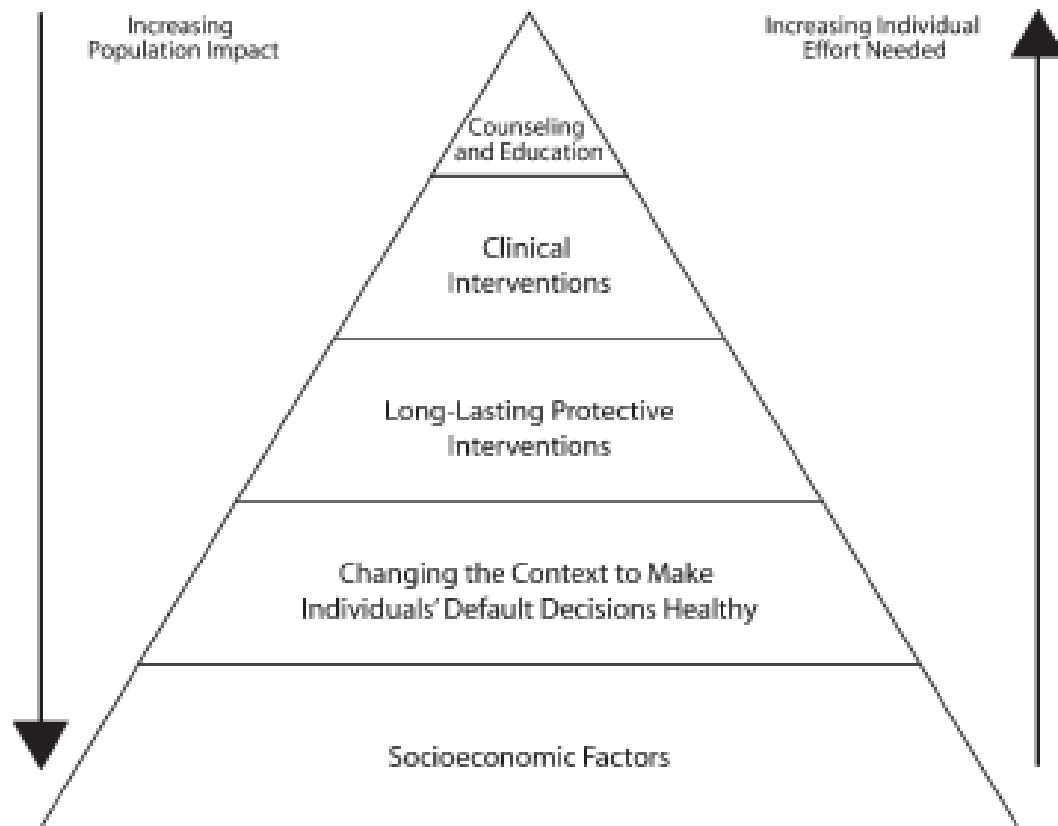


FIGURE 1—The health impact pyramid.

- Physical environment
- Food environment
- Social environment
- Economy and poverty

Policy Options to Influence Cardiometabolic Risk

- Tobacco-free and clean air legislation.
- Physical education in schools.
- Physical activity in worksites.
- Incentives for healthier food options and farmers markets.
- Influence access to healthy foods and beverages in public and educational settings.
- Sodium Reduction and trans fat elimination.
- Food and Menu labeling
- Regulation of foods in public areas.
- Community design for physical activity.

Promising Targets for Population-Wide Food Policies to Influence Cardiometabolic Risk

12 August 2011 Last updated at 06:44 ET

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Cutting salt 'should be global priority'

By Matt McGrath

Science reporter, BBC World Service

Soft Drink and Juice Consumption and Risk of Physician-diagnosed Incident Type 2 Diabetes

The Singapore Chinese Health Study

BMJ

Fruit and vegetable intake and incidence of type 2 diabetes mellitus: systematic review and meta-analysis

Patrice Carter, research nutritionist,¹ Laura J Gray, research associate in medical statistics,² Jacqui Troughton, senior research associate,³ Kamlesh Khunti, professor of primary care diabetes and vascular medicine,² Melanie J Davies, professor of diabetes medicine¹

OPEN ACCESS Freely available online

PLOS MEDICINE

Whole Grain, Bran, and Germ Intake and Risk of Type 2 Diabetes: Systematic Review and Meta-analysis

Jeroen S. L. de Munter^{1,2}, Frank B. Hu^{1,3,4}, Donna

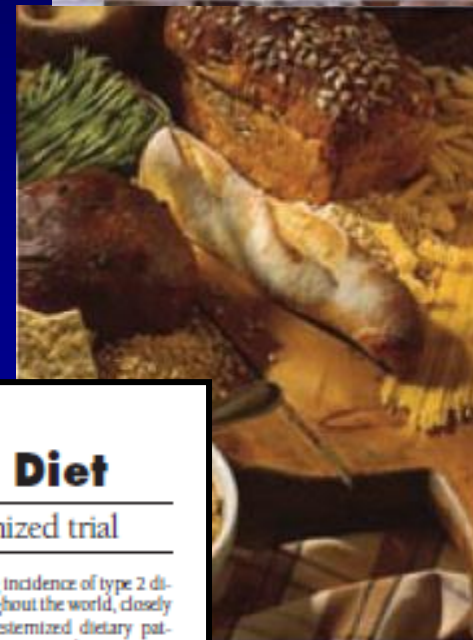
Reduction in the Incidence of Type 2 Diabetes With the Mediterranean Diet

Results of the PREDIMED-Reus nutrition intervention randomized trial

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FOR THE PREDIMED STUDY INVESTIGATORS

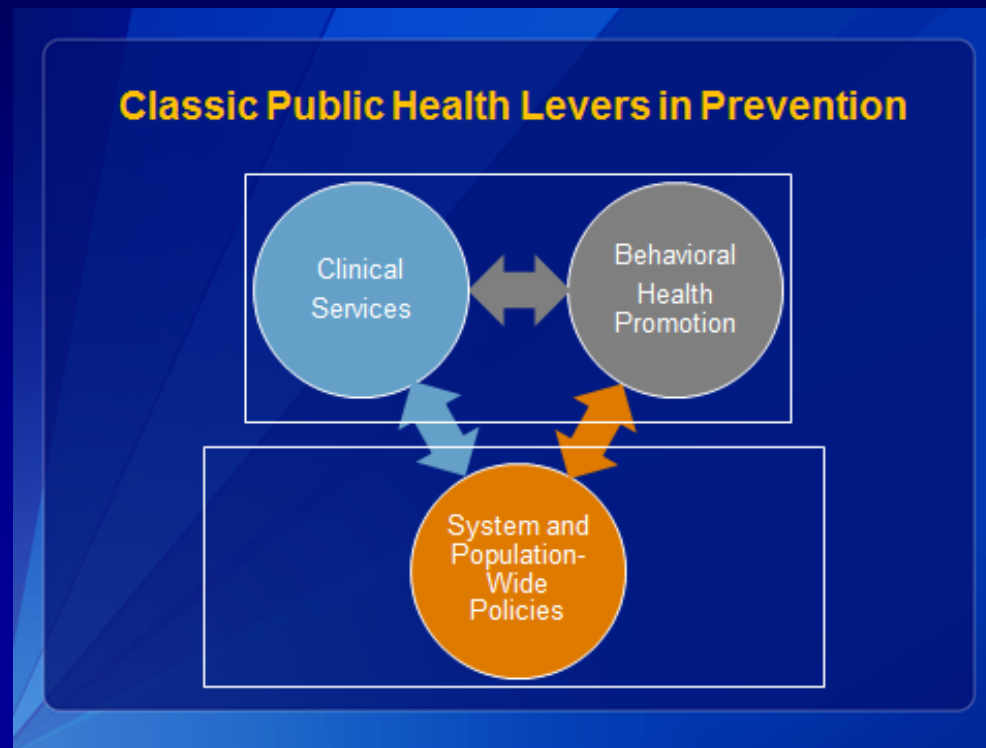
The increasing incidence of type 2 diabetes throughout the world, closely linked to westernized dietary patterns, physical inactivity, and raising rates of obesity, is a challenging health problem. Lifestyle changes are effective measures to prevent diabetes, and weight loss is the main predictor of success (1). Five clinical trials that examined the effects of



- Why are we here *together*? (i.e., diabetes and CVD?)
- What are the most effective, synergistic public health approaches for diabetes and cardiovascular disease prevention and control?
 - Enhance and support team-based care.
 - Support effective models of self-management.
 - Develop and support effective, evidence-based clinical-community partnerships.
 - Creatively change our environment to make prevention easier.

Our Role in Public Health

- Population perspective.
- Link health systems with communities and policies.
- Unified measurement and strong evaluation to drive quality and action.
- Synergistic interventions to improve efficiency and outcomes.



Can we develop smarter, more useful quality metrics?

Reviews/Commentaries/ADA Statements

CONSENSUS REPORT

Diabetes Performance Measures: Current Status and Future Directions

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OVERVIEW—Just as treatment guidelines for diabetes care were at the forefront of medical guideline development (1), diabetes has been a prominent focus of performance measurement and quality improvement initiatives for well over a decade. However, the constraints of pre-electronic health records (EHRs) data systems have consistently limited the clinical scope and sophistication of current diabetes quality measures. The U.S. health care system is nearing a tipping point in the use of more sophisticated EHR-based information systems, and widespread use of these systems will usher in a new era for diabetes quality measurement. New information system capabilities will enable improvements to existing measures and enable development of much more sophisticated measures that can accommodate personalization of clinical goals, patient preferences, and patient-reported data, thus moving both guidelines and measures toward personalization based on sophisticated assessment of the risks and benefits of certain clinical actions for a given patient at a given clinical encounter.

To facilitate discussion of the future of performance measurement in diabetes in this

era of rapid transition to EHRs, the American Diabetes Association (ADA) convened a consensus development conference in December 2010. Participating experts identified and discussed the following questions:

1. What is the evidence that measuring quality, benchmarking, and providing feedback or incentives improve diabetes care?
2. What are the limitations, burdens, and consequences (intended or unintended) of diabetes quality measures as currently structured?
3. What should be the role of shared decision making, patient preferences, and patient-reported data in quality measures?
4. What is the future of quality measurement in diabetes?
5. How can quality monitoring be integrated into population surveillance efforts?

This report summarizes the consensus meeting, and represents the expert opinion of its authors and not the official position of the ADA or any other participating organization.

1. What is the evidence that measuring quality, benchmarking, and providing feedback or incentives improve diabetes care?

The first national effort to develop a set of performance measures for diabetes was convened by the Center for Medicare and Medicaid Services (CMS), the National Committee on Quality Assurance (NCQA), and the ADA in 1995 (2). Evidence showed that complications of diabetes can be reduced by controlling hemoglobin A_{1c} (A1C), blood pressure, and LDL cholesterol, but health system performance was suboptimal and highly variable (2-4). The Diabetes Quality Improvement Program (DQIP) groups specified a set of eight process and outcomes measures that were measured at the individual patient level and aggregated across the patient samples of health plans, physicians, or other units. The DQIP measures were specified for use in the Healthcare Effectiveness Data and Information Set (HEDIS) measure established by NCQA and subsequently widely adopted for performance assessment in commercial, Medicare, and Medicaid health plans. Other health plans and some government agencies, such as the Veterans Health Administration (VHA) and CMS, also adopted the core measure set for use at physician or group practice level. Most of the measures were subsequently endorsed by the National Quality Forum (NQF) and are included in payment programs such as the Physician Quality Reporting System (PQRS) and Meaningful Use. Simple processes, such as periodic testing for A1C, LDL cholesterol, or microalbuminuria, or periodic retinal examination, are relatively easy to identify in either medical records or health care claims. Periodic performance of these processes is appropriate for nearly all patients, with the possible exception of very elderly patients for whom limited life span may preclude the need to screen for complications if they have not already appeared.

During the past decade, the proposition of patients involving these processes of care has increased across a range of settings (5-7). For several measures, including A1C, LDL cholesterol, and microalbuminuria testing, proportions are

- Personalized Risk-based Scores
- Patient Reported Measures
- Clinical Action Measures
- Measures that include resource use

From the ¹Health Pattern Research Foundation, Minneapolis, Minnesota; the ²Center for Medicare and Medicaid Services, Baltimore, Maryland; the ³National Institute for Diabetes and Digestive and Kidney Diseases, Bethesda, Maryland; the ⁴National Cancer Institute, Rockville, Maryland; the ⁵University of California-Irvine, Irvine, California; the ⁶Center for Disease Control and Prevention, Atlanta, Georgia; the ⁷Center for Clinical Management Research, VA Ann Arbor Health Care System, Ann Arbor, Michigan; the ⁸University of Michigan Department of Internal Medicine, Ann Arbor, Michigan; the ⁹Michigan Diabetes Research and Training Center, University of Michigan, Ann Arbor, Michigan; the ¹⁰National Committee for Quality Assurance, Washington, D.C.; the ¹¹Kaiser Permanente Northern California, Oakland, California; the ¹²Northwest Iowa Medical Education Foundation, Waterloo, Iowa; ¹³Campbell, Inc., Peoria, Illinois; and the ¹⁴University of Washington School of Medicine, Spokane, Washington.

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DOI: 10.2337/dci.110735

The views and opinions expressed in this article are those of the authors and do not reflect those of the American Diabetes Association, the U.S. Centers for Disease Control and Prevention, the U.S. Department of Veterans Affairs, the Centers for Medicare and Medicaid Services, the U.S. Department of Health and Human Services, the U.S. government, or other organizations with which particular authors are affiliated. © 2011 by the American Diabetes Association. Readers may use this article as long as the work is properly cited, the use is educational and not for profit, and the work is not altered. See <http://creativecommons.org/licenses/by-nc-nd/3.0/> for details.

What has worked in secondary prevention?

■ Health Services:

- Acute care and major medical interventions
- Diffusion of new science of risk factor management
- Emphasis on quality of care
- Health system adaptation and CQI

■ Health Promotion and Health Protection

- Improved education/awareness of diabetes control.
- Improved CVD risk factor education and awareness.
- Reduced Tobacco / tobacco legislation
- Less directly atherogenic food supply
- Legislation of diabetes care and supplies.